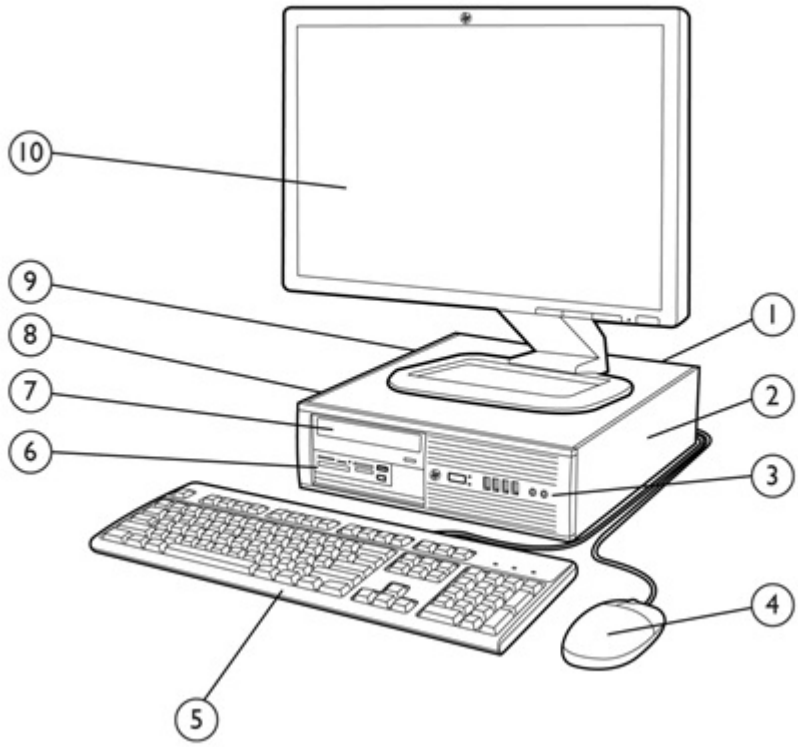
Overview

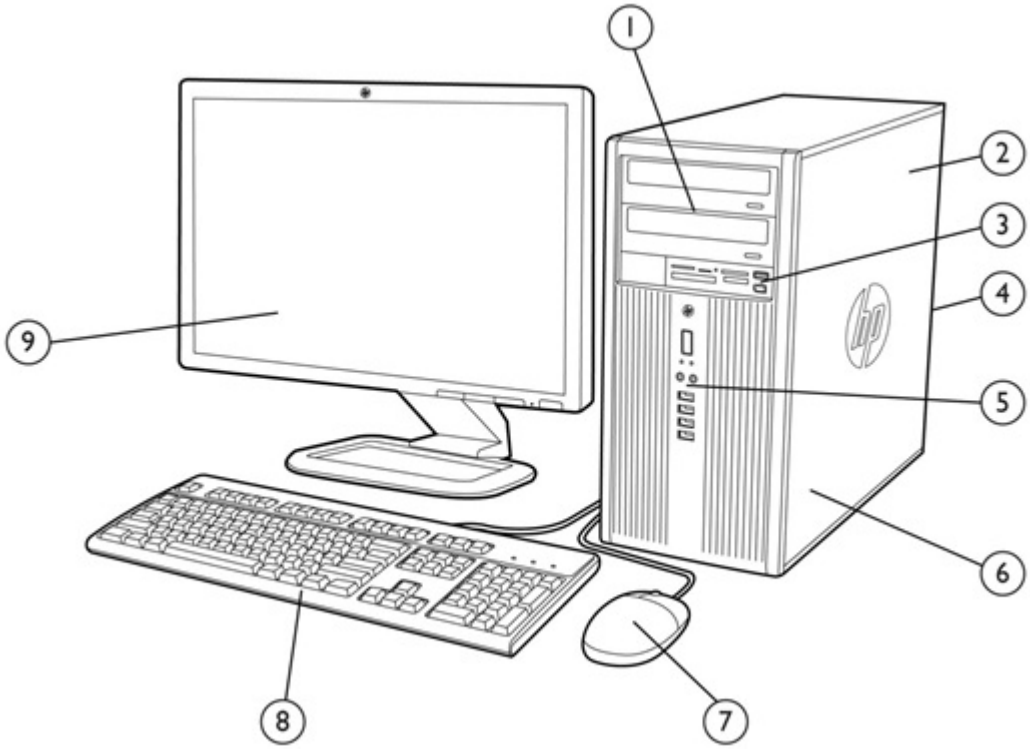
HP COMPAQ PRO 6305 SMALL FORM FACTOR BUSINESS PC



1	Rear I/O includes (4) USB 3.0 ports, (2) USB 2.0 ports, serial port, PS/2 mouse and keyboard ports, RJ-45 network interface, DisplayPort and VGA video interfaces, and 3.5mm audio in/out jacks
2	(4) Low-profile expansion slots include (1) PCI, (1) PCI Express x1, (1) PCI Express x4, and (1) PCI Express x16 graphics
3	Front I/O includes (4) USB 2.0 ports, a headphone output and a microphone jack
4	HP Mouse
5	HP Keyboard
6	3.5" external drive bay supporting an optional media card reader or a secondary data drive
7	5.25" external drive bay supporting an optical disk drive
8	3.5" internal drive bay supporting primary data drive
9	240W standard efficiency or 90% high efficiency power supply
10	HP Monitor (sold separately)

Overview

HP COMPAQ PRO 6305 MICROTOWER BUSINESS PC



1 (2) 5.25" external drive bays supporting optical disk drives or removable hard disk drives
(2) 3.5" internal drive bays supporting data drives

2 320W standard efficiency or 90% high efficiency power supply

3 3.5" external drive bay supporting the optional HP Media Card Reader

4 Rear I/O includes (4) USB 3.0 ports, (2) USB 2.0 ports, serial port, PS/2 mouse and keyboard ports, RJ-45 network interface, DisplayPort and VGA video interfaces, and 3.5mm audio in/out jacks

5 Front I/O includes (4) USB 2.0 ports, a headphone output and a microphone jack

6 (4) Full-height expansion slots include: (1) PCI, (1) PCI Express x1, and (2) PCI Express x16 graphics (secondary slot physically x16 wired as x4)

7 HP Mouse

8 HP Keyboard

9 HP Monitor (sold separately)

Overview

At A Glance

- Choice of two professional chassis form factors: Small Form Factor and Microtower.
- UEFI BIOS developed and engineered by HP for better security, manageability and software image stability
- AMD 75 chipset with integrated AMD Radeon HD 7000 Series Discrete Graphics supporting AMD A-Series Quad-Core and Dual-Core Processors
- DDR3 Synchronous Dynamic Random Access Memory (SDRAM)
- Dual independent monitor support via VGA and digital DisplayPort video interfaces
- Standard efficiency or 90% high efficiency energy saving power supplies available
- ENERGY STAR® qualified models certified EPEAT® Gold
- Guaranteed lengthy purchase lifecycles and image stability
- Software image fully compatible across all models and form factors
- Created using industry leading Design for Environment standards
- Selected configurations with global availability easily set up and ordered through HP.com Business to Business portals (http://h10019.www1.hp.com/business-site/index.html)
- Tailored HP Factory Express deployment and lifecycle services available (http://h71028.www7.hp.com/enterprise/cache/97688-0-0-225-121.aspx)
- Protected by HP Services, including standard warranties up to 5-5-5 (terms and conditions vary by country; certain restrictions and exclusions apply)
- Tool-less serviceability features for easier upgrades and repairs

Standard Features and Configurable Components (availability may vary by country)

OPERATING SYSTEMS

Preinstalled

Windows 8.1 Pro (64-bit)*
Windows 8.1 (64-bit)*
Windows® 7 Ultimate (64-bit)**
Windows® 7 Professional (32-bit)**
Windows® 7 Professional (64-bit)**
Windows® 7 Professional (32-bit) (available through downgrade rights from Windows 8 Pro)***
Windows® 7 Professional (64-bit) (available through downgrade rights from Windows 8 Pro)***
Windows® 7 Home Premium (64-bit)**
Windows® 7 Home Basic (32-bit)**
FreeDOS 2.0
Novell SUSE Linux Enterprise Desktop 11

*Not all features are available in all editions of Windows 8.1. Systems may require upgraded and/or separately purchased hardware, drivers and/or software to take full advantage of Windows 8.1 functionality. See http://www.microsoft.com.

**Not all features are available in all editions of Windows 7. This system may require upgraded and/or separately purchased hardware to take full advantage of Windows 7 functionality. See http://www.microsoft.com/windows/windows-7/ for details.

***This system is preinstalled with Windows® 7 Pro software and also comes with a license and media for Windows 8.1 Pro software. You may only use one version of the Windows software at a time. Switching between versions will require you to uninstall one version and install the other version. You must back up all data (files, photos, etc.) before uninstalling and installing operating systems to avoid loss of your data.

CHIPSET

AMD A75 chipset (FCH 6 SATA 6Gb/s, 4 USB 3.0)

PROCESSOR

AMD A-Series Quad-Core Processors

AMD A10-6800B with Radeon™ HD 8670D Graphics (4.1 GHz, 4MB L2 cache, 100W)
AMD A10-5800B with Radeon™ HD 7660D Graphics (3.8 GHz, 4MB L2 cache, 100W)
AMD A8-6500B with Radeon™ HD 8570 (3.5 GHz, 4MB L2 cache, 65W)
AMD A8-5500B with Radeon™ HD 7560D Graphics (3.2 GHz, 4MB L2 cache, 65W)

AMD A-Series Dual-Core Processors

AMD A6-6400B with Radeon™ HD 8470 (3.9 GHz, 1MB L2 cache, 65W)
AMD A6-5400B with Radeon™ HD 7540D Graphics (3.6 GHz, 1MB L2 cache, 65W)
AMD A4-6300B with Radeon™ HD 8370 (3.7 GHz, 1MB L2 cache, 65W)
AMD A4-5300B with Radeon™ HD 7480D Graphics (3.4 GHz, 1MB L2 cache, 65W)

Standard Features and Configurable Components (availability may vary by country)

GRAPHICS

Integrated on all models (depends on processor)

AMD Radeon™ HD Graphics: 7480D, 7540D, 7560D, 7660D

Discrete

AMD Radeon™ HD 6350 (512 MB) PCIe x16
(includes a DMS-59 to Dual VGA Y Cable)

AMD Radeon™ HD 7450 (1 GB) PCIe x16
(includes a DVI to VGA adapter cable)

NVIDIA NVS 300 (512 MB) PCIe x16
(Includes a DMS-59 to Dual VGA Y Cable)

NVIDIA NVS 310 (512 MB) PCIe x16
NVIDIA GeForce GT 630 PCIe x 16

Adapters and Cables

DisplayPort to DisplayPort Cable

DisplayPort to DVI-D Adapter

DisplayPort to HDMI Adapter

DisplayPort to VGA Adapter

HP DVI Cable Kit

HP DVI to VGA Adapter

STORAGE

SATA Hard Drive

250 GB, 7200 rpm, SATA 6.0 Gb/s, SMART IV, 3.5”

500 GB, 7200 rpm, SATA 6.0 Gb/s, SMART IV, 3.5”

1 TB, 7200 rpm, SATA 6.0 Gb/s, SMART IV, 3.5”

SATA Self-encrypting Drive

500 GB, SATA, 3.5"

SATA Self-encrypting Solid State Drive

256 GB, SATA, 3.5"

SATA Solid State Drive

120 GB, SATA (with 3.5" adapter)

128 GB, SATA (with 3.5" adapter)

Hybrid Drives

1 TB, SATA 8.0Gb/s, 2.5" SSHD (with 3.5" adapter)

Standard Features and Configurable Components (availability may vary by country)

500 GB, SATA 8.0Gb/s, 2.5" SSHD (with 3.5" adapter)

Optical Disc Drive

DVD-ROM

SuperMulti DVD Writer

Blu-ray BDXL SATA Drive

MEMORY

Type

DDR3 non-ECC; up to 1600 MT/s

Maximum

32 GB

# of Slots

4

NOTE: For systems configured with more than 3 GB of memory and a 32-bit operating system, all memory may not be available due to system resource requirements. Addressing memory above 4 GB requires a 64-bit operating system. Memory modules support data transfer rates up to 1600 MT/s; actual data rate is determined by the system's configured processor. See processor specifications for supported memory data rate.

NETWORKING/COMMUNICATIONS

Ethernet (RJ-45)

Broadcom NetXtreme Gigabit Ethernet BCM 5761 (integrated)
Broadcom NetXtreme Gigabit Ethernet Plus PCIe NIC (optional)
Intel Ethernet i210-ti Gigabit NIC (optional)

Wireless

802.11 g/n 1x2 PCIe NIC (optional)

AUDIO/MULTIMEDIA

High Definition Audio with Realtek ALC221 codec (all ports are stereo)

Microphone* and headphone front ports (3.5mm)

Line-out and Line-In rear Ports* (3.5mm)

Multi-streaming capable*

Internal Speaker (standard)

Thin USB power speakers (optional)

* The front microphone port is re-taskable as a Line-in, Microphone-in or Headphone-out port. Rear audio input ports are re-taskable as a Line-in or Microphone-in port. External speakers must be powered externally. Multi-streaming can be enabled in the Realtek control panel to allow independent audio streams to be sent to/from the front and rear jacks. This allows for different audio applications to use separate audio ports on the system. For example, the front jacks could be used with a headset for a communications application while the rear jacks are being used with external speakers and a multimedia application.

Standard Features and Configurable Components (availability may vary by country)

KEYBOARDS AND POINTING DEVICES

Keyboard

PS/2 Keyboard

USB Keyboard

USB Smart Card (CCID) Keyboard

USB and PS/2 Washable Keyboard

Wireless Keyboard and Mouse Combo
(Keyboard contains 25% post-consumer recycled plastic material)
Wireless Keyboard and Dongle (Brazil)

Mice

PS/2 Optical Mouse

USB Optical Mouse

USB Laser Mouse

USB and PS/2 Washable Mouse
Wireless Laser Mouse Brazil

HP BIOS

Key features of the HP BIOS include:

- Deployment and manageability – HP BIOS provides several technologies that help integrate the HP Compaq Pro 6305 Business PC into the enterprise, such as PXE, remote configuration, remote control, and F10 Setup support for 12 languages.
- Stability – HP BIOS supports the HP stable product roadmap by releasing only critical BIOS changes to the factory and advanced change notification.
- Supports UEFI specification 2.1
- Thermal and power management – The HP BIOS provides and enables thermal and power management technologies so component temperatures are managed for high reliability and to assist in operating the HP Business Desktop computer in any enterprise environment.
- Acoustic performance – Industry leading acoustic emissions across the range of operating conditions.
- Serviceability – HP BIOS provides diagnostic and detailed service information.
- Upgrades and recovery – HP BIOS provides numerous ways to upgrade HP Business Desktop computers, including BIOS updates from within DOS (DOSFlash), BIOS updates from within Windows (HPQFlash), HP Client Manager, and fail-safe recovery. In addition, the HP Business Desktop BIOS Utilities tool enables replicated BIOS setup throughout the Enterprise; it is available from within the BIOS software and from the support website.
- HP BIOS uses PKI signing of the BIOS for trusted BIOS upgrades and recovery.

Additional HP BIOS Features

- Power-On password – Helps prevent an unauthorized user from powering on the system.
- Administrator password – Also known as the setup password, this helps prevent unauthorized changes to the system configuration. If the administrator password is not known, the BIOS version cannot be changed and changes cannot be made to BIOS settings using F10 setup or under the OS.
- Advanced Configuration and Power Interface (ACPI) – Represents a significant innovation in power and configuration management, allowing operating systems and applications to manage power based on activity and usage. HP Compaq business PCs use ACPI to provide power conservation features.

Standard Features and Configurable Components (availability may vary by country)

- S5 Max Power Savings setting supports EU Lot6 requirement and allows the computer to power down below 1W is S5 (when turned off). When S5 Max Power Savings feature is enabled power to slots is turned off along with WOL functionality.

SECURITY

Trusted Platform Module (TPM) 1.2
SATA port disablement (via BIOS)
Drive lock
Serial, parallel, USB enable/disable (via BIOS)
Optional USB Port Disable at factory (user configurable via BIOS)
Removable media write/boot control
Power-On password (via BIOS)
Setup password (via BIOS)
HP Solenoid Hood Lock / Sensor
Support for chassis padlocks and cable lock devices

POWER

	SFF	MT
Power Supply		
240 W, active PFC, 90% high efficiency	X	
240 W active PFC, standard efficiency	X	
320 W, active PFC, 90% high efficiency		X
320 W active PFC, standard efficiency		X

ENVIRONMENTAL & REGULATORY

Energy Star® qualified models available
EPEAT® registered where applicable/supported. See www.epeat.net for registration status by country.
Low Halogen
TAA compliant

Standard Features and Configurable Components (availability may vary by country)

PORTS

I/O Ports – Standard

4 – USB 3.0 (rear)
4 – USB 2.0 (front)
2 – USB 2.0 (rear)
1 – Serial RS-232 compatible
2 – PS/2 (color-coded support for keyboard (purple) and mouse (green)
1 – VGA
1 – DisplayPort
1 – Microphone and Headphone (front)
1 – Audio-in and Audio-out (rear)
1 – RJ-45 (accesses the integrated network interface controller)

I/O Ports – Optional

1 – Serial RS-232 compatible
1 – Parallel
1 – eSATA

BAYS

	SFF	MT
3.5" external *(For Media Card Reader unless used for secondary data drive)*	1 each	1 each
5.25" external	1 each 8.19" depth	2 each 8.19" depth
3.5" internal HDD	1 each	2 each

SLOTS

	SFF	MT
PCI *(5 volt)*	1 each 2.5" low profile 6.6" length 25W max. power	1 each 4.2" full height 6.6" length 25W max. power
PCI Express x1 *(2.0)*	1 each 2.5" low profile 6.6" length 10W max. power	1 each 4.2" full height 6.6" length 10W max. power
PCI Express x16 *(3.0 – Primary)* (secondary slot physically x16 wired as x4)	2 each 2.5" low profile 6.6" length 25W max. power	2 each 4.2" full height 6.6" length 75W max. power

Standard Features and Configurable Components (availability may vary by country)

FORM FACTORS AVAILABLE

Small Form Factor

Microtower

SERVICE AND SUPPORT

On-site Warranty[Note 1:] Three-year (3-3-3) limited warranty delivers three years of on-site, next business-day[Note 2:] service for parts and labor and includes free telephone support [Note 3:] 24 x 7. Three-year onsite and labor are not available in all countries. Service offers terms up to 5 years by choosing a Carepack. To choose the right level of service for your HP product, visit HP Care Pack Central: www.hp.com/go/cpc

NOTE 1: Terms and conditions may vary by country. Certain restrictions and exclusions apply. Other warranty variations may be offered in your region.

NOTE 2: On-site service may be provided pursuant to a service contract between HP and an authorized HP third-party provider, and is not available in certain countries. Global service response times are based on commercially reasonable best effort and may vary by country.

NOTE 3: Technical telephone support applies only to HP-configured, HP and third-party HP-qualified hardware and software. Toll-free calling and 24 x 7 support may not be available in some countries.

OPERATING SYSTEMS

Preinstalled

Windows 8.1 Pro (64-bit)*
Windows 8.1 (64-bit)*
Windows® 7 Ultimate (64-bit)**
Windows® 7 Professional (32-bit)**
Windows® 7 Professional (64-bit)**
Windows® 7 Professional (32-bit) (available through downgrade rights from Windows 8 Pro)***
Windows® 7 Professional (64-bit) (available through downgrade rights from Windows 8 Pro)***
Windows® 7 Home Premium (64-bit)**
Windows® 7 Home Basic (32-bit)**

For all Preinstalled operating systems HP provides Microsoft WHQL certified (where applicable) drivers on www.hp.com at the time of product announcement.

Supported

Windows® 7 Enterprise (32-bit or 64-bit)**
Windows 8 Enterprise (32bit or 64-bit)*
Windows 8 Pro (32-bit)*
Windows 8 (32-bit)*
Microsoft Windows® Vista Home Basic SP2 (32 bit)
Microsoft Windows® Vista Business SP2 (32 & 64bit)
Microsoft Windows® Vista Enterprise SP2 (32 & 64 bit)

For all Supported operating systems HP performs testing of the OS, and makes available all HP value add software (OS dependent). Certified drivers are made available on www.hp.com within 30 days of product announcement.

Limited Support

Windows ® XP Professional (32-bit)

For all Limited Support operating systems HP will make available on www.hp.com certified drivers for major subsystems, if not provided by the operating system, within 30 days of product announcement.

HP performs functional testing on representative1 configurations. Some newer technologies may not be supported.

HP value added software and 3rd party applications (i.e. DVD players) are not supported.

Certified

Novell SUSE Linux Enterprise Desktop 11

For all Certified operating systems HP will submit hardware to the operating system vendor for testing and certification. All drivers would be obtained from the operating system vendor, not supplied by HP. Certification will be posted by the operating system vendor.

*Not all features are available in all editions of Windows 8.1. Systems may require upgraded and/or separately purchased hardware, drivers and/or software to take full advantage of Windows 8.1 functionality. See http://www.microsoft.com.

**Not all features are available in all editions of Windows 7. This system may require upgraded and/or separately purchased hardware to take full advantage of Windows 7 functionality. See http://www.microsoft.com/windows/windows-7/ for details.

***This system is preinstalled with Windows® 7 Pro software and also comes with a license and media for Windows 8.1 Pro software. You may only use one version of the Windows software at a time. Switching between versions will require you to uninstall one version and install the other version. You must back up all data (files, photos, etc.) before uninstalling and installing operating systems to avoid loss of your data.

The following features are not supported by Novell SUSE Linux Enterprise Desktop:

- Broadcom NetXtreme Gigabit Ethernet Plus
- HP Client Security

Technical Specifications – Operating Systems, Software and eDocumentation

- HP Blu-ray BDXL SATA Drive playback of commercial movies
- DisplayPort video interface
- HP 2nd serial port adapter
- Power Management features
- Systems configured with Linux do not qualify for ENERGY STAR®

SOFTWARE

Included	Windows 8.1	Windows 7
Security	HP Client Security • Credential Manager • Password Manager • One Step Logon • SpareKey • Device Access Manager w/JITA • HP Trust Circles • File Sanitizer Computrace (user optional)** Windows Defender	HP Client Security • Credential Manager • Password Manager • One Step Logon • Face Recognition (with optional WebCam) • SpareKey • DigitalPass • Device Access Manager w/ JITA • Drive Encryption (McAfee) • File Sanitizer • Privacy Manager Computrace (user optional)** Microsoft Security Essentials
Windows Applications	Internet Explorer Store Desktop Photos Mail Games Calendar People (contacts) Messaging SkyDrive Music Video Camera News Sports Weather Maps Finance Bing (Search)	Bing (Search) Internet Explorer
Productivity	Buy Office	Buy Office
HP Additions	HP Registration HP Getting Started with Windows 8 HP ePrint*** HP Support Assistant	Corel WinDVD 10.0 SD (DVD) Player**** Corel WinDVD 10.0 BD (Blu-Ray) Player**** Roxio MyDVD Business 2010**** Roxio MyDVD Business 2010 HD****

	CyberLink PowerDVD SD, BD CyberLink Power2Go HP Mobile Connect Skype HP PageLift SRS Premium Sound	HP Marketplace Cyberlink PowerDVD Cyberlink Power2Go HP ePrint*** HP Wallpaper SRS Premium Sound AMD Eyefinity Technology HP Recovery Disc Creator
Desktop Applications	HP Wireless Hotspot HP Support Assistant PDF Complete, Corporate edition	PDF Complete Corporate Edition WinZip Basic Adobe Flash Player
HP Documentation (eDOCS)	HP eHelp Documentation HP Hardware Reference Guide HP Quick Setup & Getting Started Guide HP Regulatory and Safety Information HP Safety and Comfort Guide HP Warranty Documentation	HP eHelp Documentation HP Hardware Reference Guide HP Quick Setup & Getting Started Guide HP Regulatory and Safety Information HP Safety and Comfort Guide HP Warranty Documentation
HP Support Applications	HP EUDI Support Environment HP Help and Support HP Setup v9.0 HP Support Assistant	HP EUDI Support Environment HP Help and Support HP Recovery Manager HP Setup v9.0 HP Support Assistant

*Available via download
** Computrace agent is shipped turned off, and must be activated by customers when they purchase a subscription. Subscriptions can be purchased for terms ranging from one to five years. Service is limited, check with Absolute for availability outside the U.S.
*** Requires an Internet connection to HP web-enabled printer and HP ePrint account registration (for a list of eligible printers, supported documents and image types and other HP ePrint details, see www.hp.com/go/eprintcenter).Requires optional broadband module. Broadband use requires separately purchased service contract. Check with service provider for coverage and availability in your area. Separately purchased data plans or usage fees may apply. Print times and connection speeds may vary.
****Preinstalled on models with webcam
*****Optional

Technical Specifications - Graphics

ATI HD 7000D Graphics (integrated)

Memory	Variable and user selectable in BIOS settings
Controller Clock Speed	Variable depending on the installed APU model
Maximum Color Depth	32 bpp
Multi-display Support	Yes
Graphics/Video API Support	DX11.1, OpenGL 2.0
Output connectors	1 VGA and 1Multi-Mode (DP++) 1.2 compliant Display Port output with HBR2, audio and multistreaming support
VGA DAC Frequency	400 MHz

Resolutions Supported*

Resolution	Maximum Refresh Rate (Hz)	
	VGA Connection	DisplayPort Connection
640x480	85	60
800x600	85	60
1024x768	85	60
1280x720	85	60
1280x1024	85	60
1440x900	75	60
1600x1200	85	60
1680x1050	75	60
1920x1080	85	60
1920x1200	85	60
1920x1440	85	60
2048x1536	75	60
2560x1440	N/A	60
2560x1600	N/A	60

*Other resolutions may also work, but have not been validated.

AMD Radeon HD 6350 Graphics Card

Introduction
The AMD Radeon HD 6350 DH PCIe x16 Graphics Card provides a low profile, PCI Express x16 graphics add-in card solution based on the AMD Radeon™ HD 6350 GPU. This card supports dual display video output through its DMS-59 connector.

An ideal solution for desktop PC customers seeking stable 2D and advanced 3D graphics performance, the AMD Radeon HD 6350 DH PCIe x16 Graphics Card is an excellent choice for small business users engaging in Web conferencing or video or photo editing, while improving your everyday business PC experience with better graphics and excellent visual display quality.

NOTE: Graphics cards use part of the total system memory (RAM) for graphics performance. System memory dedicated to graphics performance is not available for other use by other programs.

Key Benefits

- 512 MB of DDR3 dedicated on-board graphics frame buffer memory removing the need to share PC system memory

Technical Specifications - Graphics

- AMD Radeon™ HD 6350 GPU
- Conforms to full PCI Express 2.0A specification for low profile form factor (x16 lanes native PCI Express implementation)
- Provides Dual VGA (via DMS-59 connector: DVI kit optional: part number DL139A) output port
- HDCP supported on DVI outputs (DVI Requires optional kit DL139A)
- DirectX 11.1 support in hardware for optimal performance in DX11.1 applications.
- AMD Avivo technology for improved image and video playback.
- OpenGL 4.0 support in hardware for optimal performance with OpenGL applications

NOTE: The AMD Radeon HD 6350 PCIe x16 Graphics Card does not support Dual-link DVI capable monitors.

Factory Default Output Connector	DMS-59 to dual VGA Y Cable
Form Factor	PCI Express x16 (generation 2.0) Low Profile, half length, 2.3" x 6.6" Full height bracket utilized when configured to MT
Graphics Controller	AMD HD 6350 GPU
Output Connector	Single DMS-59 connector Supports dual analog displays with included DMS-59 to dual VGA Y cable. Also supports dual digital displays with an optional DMS-59 to dual DVI cable.
Core Clock	650MHz
Memory Clock	800MHz
Memory Frame Buffer	512MB, DDR3, 64-bit wide
Bus Type	PCI Express x16, Generation 2.0
Max. Vertical Refresh	85Hz
Display Support	Integrated 400MHz RAMDAC
Display Max. Resolution	Digital 1900 x 1200 Analog 2048 x 1536
Max. Power Consumption	19.9W
Supported Graphics APIs	HDCP supported on DVI output using optional DMS-59 to dual DVI cable. DirectX 11.1 support in hardware. OpenGL 4.0 support in hardware.

Display Resolutions and Refresh Rates

NOTE: other resolutions may be available but are not recommended as they may not have been tested and qualified by HP

Resolution	**Maximum Refresh Rate (Hz)**	
	Analog	**Digital**
640 x 480	85	60
800 x 600	85	60
1024 x 768	85	60
1280 x 720	85	60
1280 x 1024	85	60
1440 x 900	75	60
1600 x 1200	85	60
1680 x 1050	75	60
1920 x 1080	85	60-R
1920 x 1200	85	60-R

Technical Specifications - Graphics

1920 x 1440	85	N/A
2048 x 1536	75	N/A
2560 x 1600	N/A	N/A

Note: 60-R denotes reduced blanking timings are used on single link DVI connections and may be sued with other digital connections.

AMD Radeon HD 7450 Graphics Card

Introduction
The AMD Radeon HD 7450 DP (1GB) PCIe x16 Graphics Cards provide a low profile, PCI Express x16 graphics add-in card solution based on the AMD Radeon™ HD 7450 Graphics Processor*. These cards support dual displays with its DisplayPort and dual link DVI connectors.

An ideal solution for desktop PC customers seeking stable 2D and advanced 3D graphics performance, the AMD Radeon HD 7450 DP (1GB) PCIe x16 Graphics Cards are an excellent choice for small business users engaging in Web conferencing or video or photo editing, while improving your everyday business PC experience with better graphics and excellent visual display quality.

The AMD Radeon HD 7450 DP (1GB) PCIe x16 Graphics Cards delivers PCI Express (PCIe) features including:

- Has flexibility for new applications and enhanced performance
- Full 16 lane PCIe bus support with peak bandwidth support
- High resolution monitor support with the dual-link DVI port
- Multimode DisplayPort connector for current and future display technology support

NOTE: Graphics cards use part of the total system memory (RAM) for graphics performance. System memory dedicated to graphics performance is not available for other use by other programs.
* Based on AMD Radeon™ HD 6000 series GPU technology

Key Benefits

- 1GB of DDR3 dedicated on-board graphics frame buffer memory removing the need to share PC system memory
- Featuring the AMD Radeon™ HD 7450 Graphics Processing Unit
- Conforms to full PCI Express 2.0A specification for low profile form factor (x16 lanes native PCI Express implementation)
- Provides dual-link (DL) DVI-I and DisplayPort output ports. A DVI-to-VGA adapter cable included
- DisplayPort connector supports multimode technology to support connection to DVI-D, VGA and HDMI monitors with optional adapters in kits NR078AA, FH973AT, BP937AA, AS615AA.

  For a DisplayPort to DisplayPort connection use the optional DisplayPort Cable Kit VN567AA
- Supports audio with video through the DisplayPort connector
- DisplayPort support provided in a future driver update
- HDCP supported on DisplayPort and DVI output
- DirectX 11.1 support in hardware for optimal performance in DX11.1 applications.
- ATI Avivo technology for improved image and video playback.
- OpenGL 4.0 support in hardware for optimal performance with OpenGL applications
- Thermally controlled fan for quiet operation.
- Low Halogen construction

Factory Default Output Connector	DisplayPort, Dual-link DVI-I with DVI to VGA Adaptor
Form Factor	PCI Express x16 (generation 2.0) Low Profile, half length, 2.3" x 6.6" Full height bracket utilized when configured to MT

Technical Specifications - Graphics

Graphics Controller	AMD HD 7450 GPU (based on AMD Radeon HD 6000 series technology)
Output Connector	Dual-link (DL) DVI-I and DisplayPort output ports
Core Clock	625MHz
Memory Clock	800MHz
Memory Frame Buffer	1GB, DDR3, 64-bit wide
Bus Type	PCI Express x16, Generation 2.0
Max. Vertical Refresh	85Hz
Display Support	Integrated 400MHz RAMDAC
Display Max. Resolution	Digital 2560 x 1600 Analog 2048 x 1536
Max. Power Consumption	19.9W
Supported Graphics APIs	DirectX 11.1 support in hardware. OpenGL 4.0 support in hardware.

Display Resolutions and Refresh Rates

NOTE: other resolutions may be available but are not recommended as they may not have been tested and qualified by HP

Resolution	**Maximum Refresh Rate (Hz)**	
	Analog	**Digital**
640 x 480	85	60
800 x 600	85	60
1024 x 768	85	60
1280 x 720	85	60
1280 x 1024	85	60
1440 x 900	75	60
1600 x 1200	85	60
1680 x 1050	75	60
1920 x 1080	85	60-R
1920 x 1200	85	60-R
1920 x 1440	85	60*
2048 x 1536	75	60*
2560 x 1600	N/A	60**

* Only supported with a Display Port monitor connection
** Only supported when using a dual link DVI or DP monitor connection.
Note: 60-R denotes reduced blanking timings are used on single link DVI connections and may be sued with other digital connections.

NVIDIA NVS 300 Graphics Card

Introduction
The NVIDIA NVS 300 PCIe Graphics Card is a low profile, dual-head graphics card delivering next-generation multi-display capabilities to professional business and commercial applications.

If you require a graphics card for use with desktops in a telesales-center environment, or frequently analyze spreadsheets requiring the flexibility of dual-monitor displays, the NVIDIA NVS 300 PCIe Graphics Card is the ideal solution for you. Easily installed with a

Technical Specifications - Graphics

setup wizard, this controller integrates seamlessly with the Microsoft Windows environment. nView - NVIDIAs multi-display software, enhances your productivity in single or multi-display environments by allowing you to take advantage of features like gridlines & Virtual Desktops (Virtual Desktops allows an end user to create up to 32 individual desktops)

The NVIDIA NVS 300 PCIe Graphics Card is also GPU computing ready. It is capable of enhancing system performance if used in conjunction with applications that support GPU computing through DirectCompute, CUDA, or OpenCL frameworks.

The NVIDIA NVS 300 PCIe Graphics Card includes 512MB of DDR3 graphics memory. A minimum system memory configuration of 1GB is needed to support this card.

NOTE: Graphics cards use part of the total system memory (RAM) for graphics performance. System memory dedicated to graphics performance is not available for other use by other programs.

Key Benefits

- View your work on two monitors with nView multi-display software and create up to 32 individual desktops (using 'Virtual Desktops' with nView)
- Compatible with all major financial, non-linear editing (NLE), and electronic design automation (EDA) applications
- Includes 512 MB of dedicated DDR3 graphics memory
- Deliver crystal-clear images via dual 400-MHz RAMDACs
- Supports the latest flat-panel displays, dual analog or digital displays
- Robust IT management tools for seamless installation, deployment and maintenanc
- Passive heatsink for silent operation
- DirectX 10.1 support in hardware for optimal performance in DX10 applications
- OpenGL 3.3 support in hardware for optimal performance with OpenGL applications

Factory Default Output Connections	DMS-59 to dual VGA Y Cable
Form Factor	PCI Express x16 (generation 2.0) Low Profile, half length, 2.586" x 5.7" (6.57 x 14.48 cm) Full height bracket utilized when configured to MT
Graphics Controller	Nvidia GT218 GPU
Memory Frame Buffer	512MB DDR3, 64-bit wide
Output Connectors	Single DMS-59 connector Supports dual analog displays with included DMS-59 to dual VGA Y cable. Support dual digital displays with an optional adapter (see complete listing of available optional adapters elsewhere in this QuickSpec).
RAMDAC	Dual 400MHz
Core Clock	520MHz
Memory Clock	790MHz
Frame Buffer	512MB DDR2, 64-bit wide
Maximum Pixel Clock (analog)	400MHz
Overlay planes	One 16-bit video overly plane
Video Acceleration	Directx 10.1; OpenGL 3.3; CUDA, DirectCompute
High-definition Video	Full screen, full frame video playback of HDTV, Blu-ray and DVD content Inbuilt video decoder for multiple video formats including MPEG2, VC-1, WMV9, H.264, and MVC Capable of decoding dual Video Streams at HD (1080p) resolutions

Technical Specifications - Graphics

Processor (HDVP)	Hardware color-space conversion (YUV 4:2:2 and 4:2:0) High-Quality in-built Filtering/Scaling Stereo & HD Audio (LPCM 7.1) support for HDMI outputs (HDMI via optional DVI-HDMI dongles) with the DMS-59 to DisplayPort Adapter
Supported Graphics APIs	OpenGL 3.3 support in hardware DirectX 10.0 support in hardware

Display Resolutions and Refresh Rates

Note: other resolutions may be available but are not recommended as they may not have been tested and qualified by HP

Resolution	Maximum Refresh Rate (Hz)	
	Analog	Digital
640 x 480	85	60
800 x 600	85	60
1024 x 768	85	60
1280 x 720	85	60
1280 x 1024	85	60
1440 x 900	75	60
1600 x 1200	85	60
1680 x 1050	75	60
1920 x 1080	85	60-R
1920 x 1200	85	60-R
1920 x 1440	85	N/A
2048 x 1536	75	N/A

Note: 60-R denotes reduced blanking timings are used on single link DVI connections and may be used with other digital connections.

NVIDIA NVS 310 Graphics Card

Introduction

The NVIDIA® NVS™ 310 Graphics Card is a PCI Express low profile form factor graphics add-in card targeted as an active low cost graphics solution for the corporate business and enterprise markets.

The NVIDIA® NVS 310 graphics card is an ideal solution for customers requiring a small form factor graphics add-in card for either standard or small form factor PC designs.

Performance and Features
The NVIDIA® NVS 310 Graphics Card offers 512 MB of ultrafast DDR3 memory and is capable of supporting up to 2 displays.

- DisplayPort connector supports multimode technology to support connection to DVI-D, VGA and HDMI monitors with optional adapters in kits NR078AA, FH973AT, BP937AA, AS615AA.
- For a DisplayPort to DisplayPort connections use the optional DisplayPort Cable Kit VN567AA.

*With the appropriate adapter cable

Form Factor (H x L)	Low Profile: 2.713 × 6.15 in
Bus Type	PCI Express x16, 2.0 compliant
Graphics Controller	NVIDIA® NVS 310
Memory Size	512 MB DDR3

Technical Specifications - Graphics

Memory Clock	875MHz
Memory Bandwidth	14 GB/s
Connectors	2 x DisplayPort 1.2
Maximum Resolution	Up to 2560 x 1600 (digital display) per display.
Display Output	Up to 2 displays in the following configurations DisplayPort output: • Drives two DisplayPort enabled digital display at resolutions up to 2560 × 1600 at 60 Hz with reduced blanking, when connected natively using the 2 DisplayPort connectors on the NVS 310 graphics card • Supports 2 monitors up to resolution of 1920 × 1200 at 60 Hz with reduced blanking using DisplayPort 1.2 multi stream topology technology. DVI-D output: • Drives two digital display at resolutions up to 1920 × 1200 at 60 Hz with reduced blanking using DisplayPort to DVI-D single-link cable adaptors • Drives two digital display at resolutions up to 2560× 1600 at 60 Hz with reduced blanking using DisplayPort to DVI-D dual-link cable adaptors HDMI output: • NVS 310 is capable of driving two high definition (HD) panels up to resolutions of 1920 × 1080P at 60 Hz using DisplayPort to HDMI cable adaptors VGA display output: • Drives two analog display at resolutions up to 1920 × 1200 at 60 Hz using DisplayPort to VGA cable adaptors
Max. Power	19.5 W

Display Resolutions and Refresh Rates

Note: other resolutions may be available but are not recommended as they may not have been tested and qualified by HP

Resolution	Maximum Refresh Rates (Hz) by Connection			
	DisplayPort to VGA	**DisplayPort to DVI-D**	**DisplayPort to HDMI**	**DisplayPort**
640 x 480	85	60	60	60
800 x 600	85	60	60	60
1024 x 768	85	60	60	60
1280 x 720	85	60	60	60
1280 x 1024	85	60	60	60
1440 x 900	75	60	60	60
1600 x 1200	60	60	60	60
1680 x 1050	60	60	60	60
1920 x 1080	60-R	60-R	60	60
1920 x 1200	60-R	60-R		60
1920 x 1440				60
2048 x 1536				60
2560 x 1600				60

Technical Specifications - Graphics

Note: 60-R denotes reduced blanking timings are used on single link DVI connections and may be used with other digital connections.

NVIDIA GeForce GT 630 Graphics Card

Introduction

The NVIDIA GeForce GT630 DP (2GB) PCIe x16 Card Graphics Card provides a full height, PCI Express x16 graphics add-in card solution based on the NVIDIA Kepler Architecture GPU. The card is designed to support three display connections through its DVII, and two DisplayPort connectors.

An ideal solution for desktop PC customers seeking enhanced 2D and advanced 3D graphics performance, the NVIDIA GeForce GT630 DP (2GB) PCIe x16 Cards are an excellent choice for business users who want run multiple displays from a single graphics board. Engage in Web conferencing or video or photo editing, while improving your everyday business PC experience with better graphics and excellent visual display quality.

The NVIDIA GeForce GT630 DP (2GB) PCIe x16 Cards deliver superior PCI Express (PCIe) Gen 3 features including:

- Unprecedented flexibility for new applications and enhanced performance
- Support for NVIDIA surround technology
- Run multiple displays from a single graphics card
- Full 16 lane PCIe Generation 3 bus support with peak bandwidth support
- Wireless Display ready for future support

NOTE: Graphics cards use part of the total system memory (RAM) for graphics performance. System memory dedicated to graphics performance is not available for other use by other programs.

Key Benefits

- 2 GB of DDR3 dedicated on-board graphics frame buffer memory removing the need to share PC system memory
- Features the latest NVIDIA Kepler Architecture GPU Support
- Run multiple displays from a single graphics board
- DisplayPort 1.2 hardware ready for future multi-monitor support
- Provides Dual-Link (DL) DVI-I and two multimode DisplayPort output ports (useable at the same time)
- Also supports legacy displays using adapters:
  - DVII to VGA adapter (1 included)
  - HP DP to DVI-D adapter FH973AA (1 included)
  - HP DP to HDMI adapter BP937AA (optional)
  - HP DP to VGA adapter AS615AA (optioal)
  - HP DP to dual link DVI-D adapter NR078AA (optional)
- Supports Audio over DisplayPort for users who need audio with video thru the DisplayPort connector. Audio is also supported with the optional HP DP to HDMI adapter (BP937AA).
- Audio is also supported using DVI to HDMI adapters (Adapters not available from HP)
- Conforms to full PCI Express 3.0A specification for full height form factor (x16 lanes native PCI Express implementation)
- HDCP supported on DVI and DisplayPort outputs
- DirectX11.1 support in hardware for optimal performance in DX11.1 applications
- OpenGL 4.2 support in hardware for optimal performance with OpenGL applications

NVIDIA GeForce GT630 DP (2GB)) PCIe x16 Card

Memory	Peak theoretical memory bandwidth
2 GB DDR3 128 bit	28.5 GB/s

Compatibility

Technical Specifications - Graphics

The NVIDIA GeForce GT630 DP (2GB) PCIe x16 Card is compatible with the HP Compaq 6005 Pro MT, HP Compaq 6200 Pro MT, HP Compaq 8200 Elite MT/CMT, HP Compaq Elite 8300 MT/CMT, HP Pro 6300 MT, HP Pro 3330 MT, HP Pro 3335 MT, HP Pro 3340 MT.

NOTE: Not all models are available in all regions.

Service and Support

Your Option Limited Warranty is a one (1) year (HP Option Limited Warranty Period) parts replacement warranty on any HP-branded or Compaq-branded options (HP Options). If your HP Option is installed in an HP Hardware Product, HP may provide warranty service either for the HP Option Limited Warranty Period or the remaining Limited Warranty Period of the HP Hardware Product in which the HP Option is being installed, whichever period is the longer but not to exceed three (3) years from the date you purchased the HP Option.

Output connectors	1 - Dual link DVI; 2 - Multimode Display Port outputs	
Board display options	Supports three displays	
	Specification	**Description**
	Graphics Chip	NVIDIA Kepler Architecture GPU
Board configuration	Core clock	875 MHz
	Memory clock	891 MHz
	Frame buffer	2GB DDR3, 128 bit wide
Bus type	PCI Express (x16 lanes) 3.0	
Maximum vertical refresh rate	85 Hz	
Display support	Integrated 400 MHz RAMDAC	
Display max resolution	2560 x 1600 digital, 2048 x 1536 analog	

Display Resolutions and Refresh Rates

Note: Other resolutions may be available but are not recommended as the may not have been tested and qualified by HP.

Resolution	**Maximum Refresh Rate (Hz)**	
	Analog Connection	**Digital Connection**
640x480	85	60
800x600	85	60
1024x768	85	60
1280x720	85	60
1280x1024	85	60
1440x900	75	60
1600x1200	85	60
1680x1050	75	60
1920x1080	85	60-R
1920x1200	85	60-R
1920x1440	85	60
2048x1536	75	60
2560x1600	N/A	60

NOTE: 60-R denotes reduced blanking timings are used on single-link DVI connections and may be used with other digital connections.

Technical Specifications – Hard Disk and Solid State Storage

Introduction:

HP Serial Advanced Technology Attachment (SATA) Hard Drives maximize the performance of HP Business PCs by providing the technologies to meet your increasing storage demands with high-capacity drives offering superior reliability and performance.

SATA provides faster data transfer speeds, better system cooling airflow, more bandwidth, more headroom for speed increases in future generations and better data integrity. A next-generation technology, the SATA interface connects hard drives to the PC platform enabling easy aggregation of multiple hard drives into a single PC. This offers you the additional benefits of dedicated bandwidth, the ability to more easily identify device failures and scalability. The HP Compaq Pro 6305 Business PC supports the latest SATA 6.0Gb/s specification.

HP Drive Lock

HP Serial ATA Hard Drives offer enhanced security via a new Drive Lock. When enabled, this ATA security feature set prevents software access to user data on the drive until one or two user-defined passwords are provided.

SMART IV Technology

Self Monitoring Analysis and Reporting Technology (SMART) hard drive technology allows hard drives to monitor their own health and to raise flags if imminent failures are predicted. If the drive determines that a failure is imminent, the SMART hard drive technology enables the intelligent manageability or management software to generate a fault alert. While the current versions of SMART hard drives do a good job monitoring the data on the hard drive media, the ever increasing emphasis on reliability and quality has promoted HP to implement SMART IV technology which constantly checks that the data flow from host interface to media and media to host interface is not compromised. This is accomplished by inserting a 2 byte parity code into every 512 byte block in the data path of the hard drive's Cache RAM. This unique parity checking performed by HP's SMART IV technology hard drives, allows for more complete error detection coverage encompassing the entire data path between the host and the hard drive.

Smart IV is also known as IOEDC: I/O Error Detection Code.

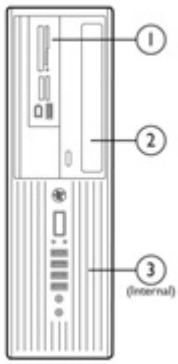
Native Command Queuing

NCQ or Native Command Queuing is a SATA protocol extension that allows the hard drive to have several write or read commands outstanding at the same time. In contrast, normal non-queued operation requires each command to be completed before the next command is issued by the host system. Queuing allows the drive to complete the commands in the order that allows for best overall throughput. It also involves an advanced method of transferring data to or from the host, called First Party Direct Memory Access (FPDMA), which allows the hard drive and the host controller to manage the data transfers for multiple outstanding commands, without involving the host processor. NCQ can contribute to better performance but the results are dependent on many factors, including the access patterns of the various applications and operating system functions that are initiating drive accesses. Enabling NCQ features in the hard drive requires AHCI support from the host system BIOS, controller, and driver.

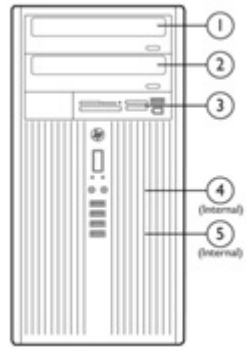
Note: GB = 1 billion bytes. Actual available capacity is less.

Technical Specifications – Hard Disk and Solid State Storage

SFF



MT



Storage Drive Support						
	SFF			MT		
	MCR	ODD	HDD	MCR	ODD	HDD
# of supported devices	1	1	2	1	2	2
Drive position	1	2	1,3	3	1,2	4,5

Controller

Hard Drive Controller

These systems provide four serial ATA (SATA) interfaces that support transfer rates up to 6.0 Gb/s (for ports 0 and 1, 3 Gb/s on all others). These systems can also support an external SATA (eSATA) device through an optional bracket/cable assembly.

SATA Interfaces

2 ea. SATA 3.0
1 ea. SATA 2.0
1 ea. eSATA

Host SATA Controller

Advanced Host Controller Interface (AHCI) Revision 1.2. The specification includes a description of the hardware/software interface between system software and the host controller hardware.

Technical Specifications – Hard Disk and Solid State Storage

HP 250-GB 7200rpm SATA 6.0Gb/s 3.5" Hard Disk Drive

Capacity	250,059,350,016 bytes
Rotational Speed	7,200 rpm
Interface	Serial ATA 3.0 (6.0 Gb/s)
Buffer Size	8 MB
Logical Blocks	488,397,168
Seek Time (typical reads, includes controller overhead, including settling)	**Single Track:** 1.0 ms **Average:** 8.5 ms **Full-Stroke:** 18 ms
Height (nominal)	1 in (2.54 cm)
Width (nominal)	Media diameter: 3.5 in (8.89 cm) Physical size: 4 in (10.2 cm)
Operating Temperature	41° to 131° F (5° to 55° C)

HP 500-GB 7.2K rpm SATA 6.0Gb/s 3.5" Hard Disk Drive

Capacity	500,107,862,016 bytes
Rotational Speed	7,200 rpm
Interface	Serial ATA 3.0 (6.0 Gb/s)
Buffer Size	16 MB
Logical Blocks	976,773,168
Seek Time (typical reads, includes controller overhead, including settling)	**Single Track:** 2.0 ms **Average:** 11 ms **Full-Stroke:** 21 ms
Height (nominal)	1 in/2.54 cm
Width (nominal)	Media diameter: 3.5 in/8.89 cm Physical size: 4 in/10.2 cm
Operating Temperature	41° to 131° F (5° to 55° C)

Technical Specifications – Hard Disk and Solid State Storage

HP 1-TB 7.2K rpm SATA 6.0Gb/s 3.5" Hard Disk Drive

Capacity	1,000,204,886,016 bytes
Rotational Speed	7,200 rpm
Interface	Serial ATA 3.0 (6.0 Gb/s)
Buffer Size	32 MB
Logical Blocks	1,953,525,168
Seek Time (typical reads, includes controller overhead, including settling)	**Single Track:** 2.0 ms **Average:** 11 ms **Full-Stroke:** 21 ms
Height (nominal)	1 in/2.54 cm
Width (nominal)	Media diameter: 3.5 in/8.89 cm Physical size: 4 in/10.2 cm
Operating Temperature	41° to 131° F (5° to 55° C)

HP 120-GB Solid State Drive

Unformatted Capacity	120 GB
Architecture	Multi Level Cell (MLC) NAND Flash with wear leveling 10 channel controller
Interface	Serial ATA 2.0 (3.0 Gb/s)
Dimensions (W x H x D)	2.74 x 0.37 x 4 in/6.98 x 0.95 x 10.2 cm
Weight	0.18 lb/80 g
Bandwidth Performance	**Sustained Sequential Read:** Up to 250 MB/s **Sustained Sequential Write:** Up to 70 MB/s **Random Read:** Up to 35K IOPs **Random Write:** Up to 6.6K IOPs
Latency	**Read:** 65-ms **Write:** 85-ms
Power	**DC power requirement:** 5 VDC 5%-100 mV ripple p-p **Total power consumption:** 0.15W (active); 0.075W (idle)
Useful Drive Life	35TB written, up to 20GB/day for 5 years
Environmental (all conditions, non-condensing)	**Operating Temperature:** 32° to 158° F (0° to 70° C) **Relative Humidity:** 5% to 95% **Maximum Wet Bulb Temperature** (operating): 84° F (29° C) **Shock:** 1,500 G/0.5-ms

Technical Specifications – Hard Disk and Solid State Storage

HP 128 GB Solid State Drive

Unformatted Capacity	128 GB*	
Architecture	Multi Level Cell (MLC) NAND	
Interface	SATA 6 GB/sec	
Dimensions (W x H x D)	2.75 x 0.276 x 3.96 in (6.985 x 0.7 x 10.05 cm)	
Weight	0.16 lb (73 g)	
Bandwidth Performance	**Sustained Sequential Read:**	Up to 450 MB/s
	Sustained Sequential Write:	Up to 260 MB/s
	Random Read:	up to 46K IOPs
	Random Write:	up to 56K IOPs
Latency	**Read:**	55µs (TYP)
	Write:	55µs (TYP)
Power	**DC power requirement:**	Min 4.5 V; Max 5.5 V
	Total power consumption:	160 mW (Active) ; <85 mW; (Idle)
Useful Drive Life	1.2 million device hours**	
Environmental (all conditions, non-condensing)	**Operating Temperature:**	32° to 158° F (0° to 70° C)
	Relative Humidity:	5% to 95%
	Maximum Wet Bulb Temperature (operating):	84° F (29° C)
	Shock:	1,500 G/1.0 msec
Regulations	UL, CSA, EN 60950-2000, CISPR Pub 22 Class B, CNS 13438, AS/NZS CISPR 22:2002 Class B, Korea KCC, CE Mark	
Option kit contents	HP 128 GB Solid State Drive, documentation, 3.5-inch bay adapter bracket, 3.5-inch bay adapter bracket screws, SATA cable	

* For solid state disk drives, GB means 1 billion bytes. 128GB is the unformatted capacity of this drive before a portion of the drive is reserved for flash management features. Actual capacity will vary by content

** The product achieves a mean time between failure (MTBF) based on population statistics not relevant to individual units.

HP Blu-ray BDXL SATA Drive

AMO Part Number	B4F70AA
Height	5.25-inch, half-height, tray-load
Orientation	Either horizontal or vertical
Interface type	SATA/ATAPI
Disc capacity	128 GB QL, 100 GB TL, 50 GB DL or 25 GB standard SL
Dimensions W x H x D (max)	14.8 x 4.2 x 18 cm, (5.8 x 1.7 x 7.9 in)
Weight (max)	2.1 lb (950 g)

Write speed		**Single-layer**	**Double-layer**
	BD-R Triple-layer: 2x, 4x CLV	2x, 4x CLV, 6x PCAV	2x, 4x CLV, 6x PCAV or ZCLV
	Quadruple-layer: 2x, 4x CLV	2x CLV	2x CLV
	BD-RE Triple-layer: 2x CLV	2x CLV	2x CLV
	DVD-R	4x CLV, 8x, 12x PCAV, 16x CAV	4x CLV, 8X PCAV or ZCLV
	DVD-RW	2x, 4x ZLV, 6x CLV or ZCLV	Not supported
	DVD+R	4x CLV, 8x, 12x PCAV, 16x CAV	2.4x, 4x CLV, 8x PCAV or ZCLV
	DVD+RW	2.4x, 4x, 6x CLV, 8x ZCLV	Not supported
	DVD-RAM	2x, 3x CLV, 5x PCAV or CLV	
	CD-R	16x CLV, 24x, 32x PCAV, 40x CAV or PCAV	
	CD-RW	4x, 10x, 16x CLV, 24x ZCLV	

Read speeds		**Single-layer**	**Double-layer**
	BD-ROM	8x CAV	8x CAV
	BD-R	8x CAV	8x CAV
	BD-RE (SL/DL)	6x CAV	6x CAV
	DVD-ROM	16x CAV	8x CAV
	DVD-R	16x CAV	8x CAV
	DVD-RW	10x CAV	Not support

Technical Specifications - Removable Storage

	DVD+R	16x CAV	8x CAV
	DVD+RW	10x CAV	Not support
	BDMV (AACS Compliant Disc)	2x CLV, 4.8x or 6x CAV	
	DVD-RAM	2x, 3x CLV, 5x PCAV or CLV	
	DVD-Video (CSS Compliant Disc)	8x CAV	
	CD-R/RW/ROM	40x / 40x / 40x CAV	
	CD-DA (DAE)	32x CAV	
	80 mm CD	16x CAV	
Sustained Transfer rate	**BD-ROM**	36 MB/s (8x) max.	
	DVD-ROM	21.6 MB/s (16x) max.	
	CD-ROM	6,000 KB/s (40x) max.	
Access times (typical reads, including setting)	**Random**	DVD-ROM: 150 ms (typical), CD-ROM: 140 ms (typical)	
	Full Stroke	DVD-ROM: 240 ms (typical), CD-ROM: 230 ms (typical)	
Power	**Source**	SATA DC power receptacle	
	DC Power Requirement	5 VDC ± 5%-100 mV ripple p-p 12 VDC ± 10%-100 mV ripple p-p	
	DC Current	5 VDC -1200 mA typical, 1500 mA maximum 12 VDC -1000 mA typical, 1500 mA maximum	
Environmental (all conditions non-condensing)	**Temperature** (operating)	41° to 122° F (5° to 50° C)	
	Relative Humidity (operating)	10% to 90%	
	Maximum Wet Bulb Temperature (operating)	86° F (30° C)	

HP SATA 16x SuperMulti Drive

AMO Part Number	QS208AA	
Height	5.25-inch, half-height, tray-load	
Orientation	Either horizontal or vertical	
Interface type	SATA/ATAPI	
Disc capacity	8.5 GB DL or 4.7 GB standard	
Dimensions (W x H x D)	5.9 x 1.7 x 8.0 in (15.0 x 4.4 x 20.3 cm)	
Weight (max)	2.6 lb (1.2 kg)	
DVD Media Read Access	**Random**	DVD: < 140 ms (typical), CD: < 125 ms (typical)
	Full Stroke	DVD: < 250 ms (seek), CD: < 210 ms (seek)

Technical Specifications - Removable Storage

Write speed	**DVD-RAM**	Up to 5X
	DVD+R	Up to 16X
	DVD+RW	Up to 8X
	DVD+R DL	Up to 8X
	DVD-R DL	Up to 8X
	DVD-R	Up to 16X
	DVD-RW	Up to 6X
	CD-R Up	Up to 48X
	CD-RW Up	Up to 24X
Read speeds	**DVD-RAM**	Up to 12X
	DVD+RW	Up to 8X
	DVD-RW	Up to 8X
	DVD+R DL	Up to 8X
	DVD-R DL	Up to 8X
	DVD-ROM	Up to 16X
	DVD-ROM DL	Up to 8X
	DVD+R	Up to 16X
	DVD-R	Up to 16X
	CD-ROM, CD-R	Up to 48X
	CD-RW	Up to 32X
Power	**Source**	SATA DC power receptacle
	DC Power Requirement	5 VDC ± 5%-100 mV ripple p-p 12 VDC ± 5%-200 mV ripple p-p
	DC Current	5 VDC -1000 mA typical, 1600 mA maximum 12 VDC -600 mA typical, 1400 mA maximum
Environmental (all conditions non-condensing)	**Operating Temperature**	41° to 122° F (5° to 50° C)
	Storage Temperature	-22° F to 140° F (-30° C to 60° C)
	Relative Humidity	10% to 90%
	Maximum Wet Bulb Temperature	86° F (30° C)

HP DVD-ROM Drive

AMO Part Number	AR629AA		
Height	5.25-inch, half-height, tray-load		
Orientation	Either horizontal or vertical		
Interface type	Serial ATA		
Dimensions (W x H x D)	5.8 x 1.7 x 6.9 in (14.8 x 4.2 x 17.5 cm)		
Weight (max)	2.1 lb (950 kg)		
	CD Media Read Access	Random	< 120 ms typical
		Full Stroke	< 200 ms typical

Technical Specifications - Removable Storage

Performance	DVD Media Read Access	Random	< 130 ms typical
		Full Stroke	< 240 ms typical
	CD Media Read Transfer	CD-ROM, CD-R Read	Up to 6000 KB/s (40X)
		CD-RW Read	Up to 4800 KB/s (32X)
		Digital/Analog Audio Playback	Up to 2400 KB/s (16X)
		Digital Audio Extraction (CD-ROM, CD-R)	Up to 6000 KB/s (40X)
		Digital Audio Extraction (CD-RW)	Up to 4800 KB/s (32X)
		Video CD Playback	Up to 2400 KB/s (16X)
	DVD Media Read Transfer	DVD-ROM SL Read	Up to 21600 KB/s (16X)
		DVD-ROM DL Read	Up to 10800 KB/s (8X)
		DVD Video Playback	Up to 10800 KB/s (8X)
		DVD Video SL (other than playback)	Up to 21600 KB/s (16X)
		DVD Video DL (other than playback)	Up to 10800 KB/s (8X)
		DVD-R	Up to 21600 KB/s (16X)
		DVD+R	Up to 21600 KB/s (16X)
		DVD-RW	Up to 10800 KB/s (8X)
		DVD-R DL	Up to 10800 KB/s (8X)
		DVD+RW	Up to 10800 KB/s (8X)

	Media	Read	Write
Media Compatibility	CD-ROM	Yes	No
	CD-R	Yes	No
	CD-RW	Yes	No
	DVD-ROM	Yes	No
	DVD-ROM DL	Yes	No
	DVD-RAM	Yes	No
	DVD+R	Yes	No
	DVD+R DL	Yes	No
	DVD+RW	Yes	No
	DVD-R	Yes	No
	DVD-RW	Yes	No
	DVD-R DL	Yes	No

Power Supply	Source	SATA DC power receptacle	
	DC Power Requirement	5 VDC ± 5%	100 mV ripple p-p
		12 VDC ± 5%	200 mV ripple p-p
		5 VDC	1000 mA (typical) 1600 mA (max.)

Technical Specifications - Removable Storage

	DC Current	12 VDC	1200 mA (typical) 2000 mA (max.)
		Total Drive Power (Standby Mode)	< 2.5W
Rear Panel	SATA Power Connector, 15-pin SATA Data Connector, 7-pin Markings to identify each connector		
Environmental conditions (all conditions non-condensing)	Operating Temperature	41° to 122° F (5° to 50° C)	
	Storage Temperature	–22° F to 140° F (–30° C to 60° C)	
	Relative Humidity	10% to 90%	
	Maximum Wet Bulb Temperature	86° F (30° C)	
	Altitude	0 to 10,171 ft. (0 to 3,100 meters)	

HP 22-n-1 Media Card Reader

USB Interface	USB 2.0 High-speed interface **Note:** Requires the USB cable to be connected to the internal USB 2.0 port or a USB 2.0 PCI card.
Advance protocol support	Supports hardware ECC (Error Correction Code) function Supports hardware CRC (Cyclic Redundancy Check) function Supports MS 4-bit parallel transfer mode Supports MS-PRO 4-bit parallel transfer mode Supports MS PRO-HG Duo 4-bit parallel transfer mode Supports SD 4-bit parallel transfer mode Supports high-speed 50Mhz SD 4-bit card (version 2.0) Supports high-speed 52Mhz MultiMediaCard 8-bit card (version 4.2) Supports CF v4.0 with PIO mode 6 and Ultra DMA mode CompactFlash Type I CompactFlash Type II Microdrive MultiMediaCard Reduced Size MultiMediaCard (RS MultiMediaCard) MultiMediaCard 4.2 (MultiMediaCard Plus, including MultiMediaCard Plus HC) Reduced Size MultiMediaCard 4.2 (MultiMediaCard Mobile, including MultiMediaCard Mobile HC) Secure Digital Card (SD) Secure Digital High Capacity (SDHC)

Technical Specifications - Removable Storage

Supported media type	miniSD miniSD High Capacity Micro SD (T-Flash) Micro SD HC Memory Stick Memory Stick Select Memory Stick Duo (MS Duo) Memory Stick PRO (MS PRO) Memory Stick PRO Duo (MS PRO Duo) Memory Stick PRO-HG Duo MagicGate Memory Stick (MG) MagicGate Memory Stick Duo Picture Card	
Supported media type with card adapter	Memory Stick Micro (M2) MultiMediaCard Micro	
Environmental	Operational Environmental Extremes	Test Parameters/Conditions - Power applied, unit operating on system ±5% nominal supply voltage. 10°C 10% R.H. = 24 hours 10°C 90% R.H. = 24 hours 20°C 90% R.H. = 24 hours 30°C 90% R.H. = 24 hours 40°C 90% R.H. = 24 hours 50°C 90% R.H. = 24 hours 50°C 10% R.H. = 24 hours
	Storage Environmental Extremes	Test Parameters/Conditions 140°F (60°C) @ 80% R.H. for 96 hours –22°F (–30°C) @ 20% R.H. for 48 hours No power applied Delta °C < 1.0°C/min Delta % R.H. < 1.5% R.H./min
Approvals	USB-IF, WHQL, Compliant with USB Mass Storage Class Bulk only Transport Specification Rev. 1.0 Compliant Intel Front Panel I/O Connectivity Design Guide V. 1.3 FCC, CE, BSMI, C-Tick, VCCI, MIC, cUL, TUV-T	

Technical Specifications – Memory

System Memory Support

The HP Compaq Pro 6305 Business PC supports:

- Two channels of non-ECC DDR3 unbuffered dual in-line memory modules (UDIMM) or DDR3 unbuffered small outline dual in-line memory modules (SO-DIMM) with a maximum of two DIMMs per channel
- Single-channel and dual-channel memory organization modes
- Data burst length of eight for all memory organization modes
- 64-bit wide channels
- DDR3 system memory I/O voltage of 1.5V
- Theoretical Maximum Memory Bandwidth:
  - 10.6 GB/s in single-channel mode of 21.3 GB/s in dual-channel mode assuming DDR3 1333 MT/s
  - 12.8 GB/s in single-channel mode or 25.6 GB/s in dual-channel mode assuming DDR3 1600 MT/s
  - 32 GB maximum memory support depending upon available number of DIMM sockets

CAUTION: You must shut down the computer and disconnect the power cord before adding or removing memory modules. Regardless of the power-on state, voltage is always supplied to the memory modules as long as the computer is plugged in to an active AC outlet. Adding or removing memory modules while voltage is present may cause irreparable damage to the memory modules or system board.

Memory Configurations:

Slot 1 is black and must always be populated. Not all memory configurations possible are represented below.

NOTE: For systems configured with more than 3 GB of memory and a 32-bit operating system, all memory may not be available due to system resource requirements. Addressing memory above 4 GB requires a 64-bit operating system.

Total Memory	Socket			
	Channel A		Channel B	
	1 (black)	2 (white)	3 (white)	4 (white)
2 GB	2 GB	unpopulated	Unpopulated	unpopulated
4 GB (dual channel)	2 GB	unpopulated	2 GB	unpopulated
8 GB (dual channel)	2 GB	2 GB	2 GB	2 GB
16 GB (dual channel)	8 GB	4 GB	4 GB	4 GB

Broadcom NetXtreme Gigabit Ethernet BCM 5761 (integrated)

Connector	RJ-45
Controller	Broadcom 5761 PCI-Express LAN Controller
Memory	8 MB NVRAM serial Flash
Data rates supported	10/100/1000 Mbps
Compliance	IEEE 802.1P, 802.1Q, 802.2, 802.3, 802.3AB, 802.3u, 802.3i, and 802.3x
Bus architecture	PCI-E
Data path width	Single channel, PCI-E
Data transfer mode	Bus-master DMA
Power requirement	1.8W @ 3.3V
Boot ROM support	Yes
Network transfer mode	Full-duplex
	Half-duplex (not supported for the 1000BASE-T transceiver)
Network transfer rate	10BASE-T (half-duplex) 10 Mbps
	10BASE-T (full-duplex) 20 Mbps
	100BASE-TX (half-duplex) 100 Mbps
	100BASE-TX (full-duplex) 200 Mbps
	1000BASE-T (full-duplex) 2000 Mbps (actual rate limited by PCI Bus)
Environmental	**Operating Temperature:** 32° to 131°F (0° to 55° C)
	Operating Humidity: 131° F (55° C) with 5% to 95% non-condensing humidity
Management capabilities	ACPI, WOL and DMI 2.0, PXE 2.1, WfM 2.0, Broadcom mgmt utility, ASF2.0 profiles

HP 802.11 b/g/n Wireless Network Connection

Dimensions (L x H)	2.8 x 2.2 in (7.0 x 5.7 cm)
Weight	0.08 lbs (40 g)
Controller	Ralink RT2790
System interface	PCI Express x1
Network standard	802.11 b/g/n
Frequency band	2.400 - 2.497 GHz
Operating temperature	14° to 149°F, operating (-10° to 65°C, operating)
Storage temperature	-40° to 176°F, non-operating (-40° to 80°C, non-operating)
Humidity	10-90% operating 5-95% non-operating
Operating voltage	3.3V +/- 9% 12V +/- 8%

Technical Specifications - Communications

	Platform/WLAN Mode	Power Consumption
Power Consumption	Maximum Power Consumption:	10 Watts
	Transmit Only	4 Watts maximum averaged power over 1 second
	Transmit Packet or Active Scanning	1000 mA peak current for 100 microseconds or longer
	Receive Only Mode or Idle without IEEE PSP mode enabled	3 Watts maximum averaged over 1 second
	Idle, with IEEE PSP mode enabled	1.0 Watts maximum averaged over 1 second
	Transmit Disabled (turned off in software)	50 mW maximum, averaged over 1 second
	Platform in S3 or S4 (power removed from Low Profile PCI Express Card)	5 mW maximum, averaged over 1 second
Output Power (approximate)	802.11b mode	+19 dBm +/- 1.0 dB maximum
	802.11g mode	+17 dBm +/- 1.0 dB maximum
	EWC mode	+17 dBm +/- 1.0 dB maximum (total power in all transmit chains)
Security	IEEE and WiFi compliant 64 / 128 bit WEP encryption	
	AES: CCM	
	802.1x authentication	
	WPA: 802.1x. WPA-PSK and TKIP	
	WPA2 certification	
	IEEE 802.11i	
	Cisco Certified Extensions, all versions through V5	
Antenna	HP part number 497317-003	
Certifications	Wi-Fi certified	
Certifications for use by country	United States, Canada, Peru, Taiwan	

Technical Specifications - Audio

High Definition Audio

Type	Integrated
HD Stereo Codec	Realtek 2-channel ALC221 codec
Audio I/O Ports	Front microphone-In (150-K ohm Input Impedance) Rear Line-In/Microphone input (150-K ohm Input Impedance, function is configurable by audio driver) Rear Line-Out* (190 ohms Output Impedance, expects at least a 10-K ohm load) Front Headphone-Out (0.5 Ohm Output Impedance, expects at least a 32 ohm load) Front Microphone/Headphone jack is re-task able to provide Microphone input, line-in or Headphone output to support connecting two headphones to the front of the system. When configured as a second front headphone output, both front headphone outputs are always driven with the same signal. All ports are 3.5mm
Internal Speaker Amplifier	1.5W amplifier for the internal speaker only. External speakers must be powered externally. Rear Line-in audio port is re-taskable as either Line-in or Microphone-In.
Multi-streaming Capable	Multi-streaming can be enabled in the Realtek control panel to allow independent audio streams to be sent to/from the front and rear jacks.
Sampling	8 kHz - 192 kHz
Wavetable Syntheses	Yes – Uses OS soft wavetable
Analog Audio	Yes
# of Channels on Line-Out	Stereo (Left & Right channels)
Internal Speaker	Yes
External Speaker Jack	Yes

HP Thin USB Powered Speakers

On/Off/Volume Controls	Right side of right speaker	
Power LED	Front of right speaker (green)	
Frequency Response	FO to 20kHz	
Watts	2/3 watt (normal/maximum)	
Dimensions/Speaker (H x W x D)	5.72 x 3.74 x 0.96 in 14.52 x 9.50 x 2.45 cm	
Net Weight	0.68 lbs 0.31kg	
Color	Black	
Environmental (all conditions non-condensing)	Operating Temperature:	14° to 104° F (-10° to 40° C)
	Relative Humidity	40% to 90%
Speaker Cable Length	Input Cord:	5.91 ft (1800 mm)
	L-channel Cord:	3.28 ft (1000 mm)
	USB Cord:	5.91 ft (1800 mm)

HP USB Standard Keyboard

Physical characteristics	Keys	104, 105, 106, 107, 109 layout (depending upon country)
	Dimensions (L x W x H)	18.0 x 6.4 x 0.98 in (45.8 x 16.3 x 2.5 cm)
	Weight	2 lb (0.9 kg)
Electrical	Operating voltage	+ 5VDC ± 5%
	Power consumption	50-mA maximum (with three LEDs ON)
	System interface	USB Type A plug connector
	ESD	CE level 4, 15-kV air discharge
	EMI - RFI	Conforms to FCC rules for a Class B computing device
	Microsoft® PC 99 - 2001	Functionally compliant
Mechanical	Languages	38 available
	Keycaps	Low-profile design
	Switch actuation	55-g nominal peak force with tactile feedback
	Switch life	20 million keystrokes (using Hasco modified tester)
	Switch type	Contamination-resistant switch membrane
	Key-leveling mechanisms	For all double-wide and greater-length keys
	Cable length	6 ft (1.8 m)
	Microsoft PC 99 - 2001	Mechanically compliant
Environmental	Acoustics	43-dBA maximum sound pressure level
	Operating temperature	50° to 122° F (10° to 50° C)
	Non-operating temperature	-22° to 140° F (-30° to 60° C)
	Operating humidity	10% to 90% (non-condensing at ambient)
	Non-operating humidity	20% to 80% (non-condensing at ambient)
	Operating shock	40 g, six surfaces
	Non-operating shock	80 g, six surfaces
	Operating vibration	2-g peak acceleration
	Non-operating vibration	4-g peak acceleration
	Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence
	Drop (in box)	42 in (107 cm) on concrete, 16-drop sequence
Approvals	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC	

Technical Specifications - Input/Output Devices

Ergonomic compliance	ANSI HFS 100, ISO 9241-4, and TUVGS	
Kit contents	Keyboard	Installation Guide
	Warranty Card	Safety and Comfort Guide

HP PS/2 Standard Keyboard

Physical Characteristics	Keys	104, 105, 106, 107, 109 layout (depending upon country)
	Dimensions (L x W x H)	18.0 x 6.4 x 0.98 in (45.8 x 16.3 x 2.5 cm)
	Weight	2 lb (0.9 kg) minimum
Electrical	Operating voltage	+ 5VDC ± 5%
	Power consumption	50-mA maximum (with three LEDs ON)
	System interface	PS/2 6-pin mini din connector
	ESD	CE level 4, 15-kV air discharge
	EMI - RFI	Conforms to FCC rules for a Class B computing device
	Microsoft PC 99 - 2001	Functionally compliant
Mechanical	Languages	38 available
	Keycaps	Low-profile design
	Switch actuation	55-g nominal peak force with tactile feedback
	Switch life	20 million keystrokes (using Hasco modified tester)
	Switch type	Contamination-resistant switch membrane
	Key-leveling mechanisms	For all double-wide and greater-length keys
	Cable length	6 ft 1.8 m
	Microsoft PC 99 - 2001	Mechanically compliant
Environmental	Acoustics	43-dBA maximum sound pressure level
	Operating temperature	50° to 122° F (10° to 50° C)
	Non-operating temperature	-22° to 140° F (-30° to 60° C)
	Operating humidity	10% to 90% (non-condensing at ambient)
	Non-operating humidity	20% to 80% (non-condensing at ambient)
	Operating shock	40 g, six surfaces
	Non-operating shock	80 g, six surfaces
	Operating vibration	2-g peak acceleration

	Non-operating vibration	4-g peak acceleration
	Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence
	Drop (in box)	42 in (107 cm) on concrete, 16-drop sequence
Approvals	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC	
Ergonomic compliance	ANSI HFS 100, ISO 9241-4, and TUVGS	

HP USB Smart Card (CCID) Keyboard

Introduction:

Boost your security, simplify access procedures and reduce the costs associated with managing networks by preventing unauthorized access to your computers and networks using smartcard technology with the HP Smart Card (CCID) Keyboard.

The USB Smart Card (CCID) Keyboard is a full-sized keyboard that takes advantage of digital signatures and certificates to secure the environment for transactions performed on both public and private networks. The USB Smart Card (CCID) Keyboard works with all smart cards that comply with ISO standard 7816.

Smart cards are easy-to-use credit card-sized devices which require multiple forms of information to be validated before you gain access to your accounts or resources. Used worldwide, smart cards strengthen access to a network or other resource using dual-factor authentication. Implementing a two-factor authentication (or multi-factor authentication) process reduces the risk of unauthorized access by verifying and validating your identity in one of the following ways:

- Something you know – a combination of username and password or PIN
- Something you have – a smart card or security token.

Something you have (smart card) plus something you know (PIN), improves user-access security within corporate network environments. Smart cards are used in government agencies, healthcare companies and the finance industry.

HP Client Security Smart Card Manager provides authentication software for the smart card. The Smart Card Reader module works with the HP Client Security Manager and enables the user to setup, use, and manage the smart card. This allows strengthened security with HP patented technology.

Key Benefits:	• Protects against unauthorized access with smart card technology • Delivers even greater security when combined with a HP Client Security smart card and the HP Client Security Software • Combination of username and password or pin with a smart card or security token • Secures online transactions using digital signatures and certificates • Conforms to industry standards for ease of setup and use • Delivers long product life and quiet operation with high-impact materials and lubricated keys • Spill drain feature	
Physical Characteristics	Keys	104, 105, 106, 107, 109 layout (depending upon country
	Form factor	USB basic smart card keyboard
	Colors	Carbonite/Silver
	Dimensions (H x W x D)	18.2 x 6.3 x 1.3 in 46.3 x 16.1 x 3.3 cm
	Weight	2 lb (0.9 kg) minimum

Technical Specifications - Input/Output Devices

Electrical	Operating voltage	+ 5VDC ± 5%	
	Power consumption	100-mA maximum (with four LEDs ON)	
	System interface	USB Type A plug connector	
	ESD	CE level 4, 15-kV air discharge	
	EMI - RFI	Conforms to FCC rules for a Class B computing device	
Mechanical	Microsoft PC 99 - 2001	Functionally compliant	
	Languages	30+ available	
	Keycaps	Standard design	
	Switch actuation	55 g nominal peak force with tactile feedback	
	Switch life	20 million keystrokes (using Hasco modified tester)	
	Switch type	Contamination-resistant membrane	
	Key-leveling mechanisms	For all double-wide and greater-length keys	
	Cable length	6 ft (1.8 m)	
Environmental	Microsoft PC 99 - 2001	Mechanically compliant	
	Acoustics	43-dBA maximum sound pressure level	
	Operating temperature	50° to 122° F (10° to 50° C)	
	Non-operating temperature	-22° to 140° F (-30° to 60° C)	
	Operating humidity	10% to 90% (non-condensing at ambient)	
	Non-operating humidity	20% to 80% (non-condensing at ambient)	
	Operating shock	40 g, six surfaces	
	Non-operating shock	80 g, six surfaces	
	Operating vibration	2-g peak acceleration	
	Non-operating vibration	4-g peak acceleration	
	Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence	
	Drop (in box)	42 in (107 cm) on concrete, 16-drop sequence	
SmartCard Function	Support	All ISO 7816 smart cards	
	Interface	Reads from and writes to all ISO7816-1, 2, 3, 4 memory and microprocessor smart cards (T=0, T=1)	
	Chipset	SCM STCIII	
	Standard APIs supported	PC/SC, EMV2000, CT-API	
	Power	USB Port	
		Short circuit detection (protects smart card and reader)	
		Power supply compliant with ISO7816 and EMV (5V, 60 mA)	
		Supports 3-V and 5-V cards	
	Power consumption	100-mA maximum draw	
	Communication	From card	9600 bps to 330,000 bps
		From computer	12 Mbps (USB transfer speed)
	Landing mechanism	Contact device	Friction contact
		Card insertions rating	Up to 100,000 insertion cycles

Technical Specifications - Input/Output Devices

	Interface modes	CCID protocol	
	Reader performance interface	USB connection	
	Electro-magnetic standards	Europe	2004/108/EC
		USA	USAFCC part 15
Approvals	CE-Mark, UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC, EMV2000, USB-IF		
Ergonomic Compliance	ISO 9241-4, TUVGS		
Kit Contents	Keyboard, I/O Security and Documentation CD, warranty card		

HP USB PS/2 Washable Keyboard

	Keys	104 (US) layout or 105 (EU) layout (depending upon country)
Physical Characteristics	Dimensions (L x W x H)	17.67x 6.62 x 1.38 in (449 x 168 x 35 mm)
	Weight	1.7 lb (0.77 kg) minimum
Electrical	Operating voltage	+ 5VDC ±5%
	Power consumption	50-mA maximum (with three LEDs ON)
	System interface	USB Type A plug connector
	ESD	CE level 4, 15-kV air discharge
	EMI - RFI	Conforms to FCC rules for a Class B computing device
Mechanical	Microsoft® PC 99 - 2001	Functionally compliant
	Keycaps	Stepped -profile design
	Switch actuation	55-g nominal peak force with tactile feedback
	Switch life	20 million keystrokes
	Switch type	Contamination-resistant switch membrane
	Key-leveling mechanisms	For all double-wide and greater-length keys
	Cable length	7 ft (2.2 m)
	Microsoft PC 99 - 2001	Mechanically compliant
Environmental	Acoustics	43-dBA maximum sound pressure level
	Operating temperature	50° to 122° F (10° to 50° C)
	Non-operating temperature	-22° to 140° F (-30° to 60° C)
	Operating humidity	10% to 95% (non-condensing at ambient)
	Non-operating humidity	0% to 95% (non-condensing at ambient)
	Operating shock	40 g, six surfaces

Technical Specifications - Input/Output Devices

Environmental	Non-operating shock	80 g, six surfaces
	Operating vibration	2-g peak acceleration
	Non-operating vibration	4-g peak acceleration
	Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence
	Drop (in box)	42 in (107 cm) on concrete, 16-drop sequence
Operating system support	Windows® 7, Windows Vista, Windows XP Professional	
Approvals	UL, cUL, FCC, CE, TUV GS, VCCI, BSMI, C-Tick, KCC, USB-IF, WHQL, EN/IEC 60601-1, IP66/NEMA4X	
Ergonomic compliance	ANSI HFS 100, ISO 9241-4, and TUVGS	

HP Wireless Keyboard and Mouse

Keyboard	Dimensions (H x L x W)	1.47 x 18.06 x 6.43 in (37.3 x 458.8 x 163.2 mm)
	Weight – Without Two AA Alkaline Batteries	1.96 lb (890 g)
Mouse	Dimensions (H x L x W)	1.51 x 4.69 x 2.71 in (38.4 x 119 x 68.9 mm)
	Weight – Without Two AA Alkaline Batteries	0.17 lb (80 g)
Receiver	Dimensions (H x L x W)	0.31 x 0.72 x 2.24 in (8 x 18.4 x 57 mm)
	Weight	0.27 oz (7.6 g)
	Cable Length – Minimum	6 ft (1.8 m)
	Range	32.8 ft (10 m)
System Requirements	Windows 7 Home Basic*, Windows 7 Home Premium*, Windows 7 Professional Edition 32*, Windows 7 Professional Edition 64*, Windows 7 Ultimate Edition 32*, Windows 7 Ultimate Edition 64* Windows Vista or Windows XP Available USB port for the receiver CD-ROM Drive *This system may require upgraded and/or separately purchased hardware and/or a DVD drive to install the Windows 7 software and take full advantage of Windows 7 functionality. See http://www.microsoft.com/windows/windows-7/ for details.	
	Product Safety	UL; CSA /TUV (Europe only); CE Mark
	Ergonomics	ANSI; ISO (Europe only); GS Mark (Germany only)
	EMC	FCC; CISPR; ACA; BSMI; MIC; VCCI
	CE Mark	EN 55022:1998; EN 55024
	Design Guidelines for PCs	PC 99 - connector overmold colors; PC 2001 - full functionality
	Telecom	All local telecom requirements and approvals for intended markets

	USA	FCC Part 15 Equipment Certificate; CFR 47, Part 15; other local requirements
	Country Support	US, Belgium, Switzerland, Spain, Denmark, Netherlands, France, Germany, Italy, Portugal, Sweden, Norway, Finland, UK, Poland, Czech Republic, Turkey, Greece, Austria, Bulgaria, Cyprus, Estonia, Hungary, Ireland, Latvia, Lithuania, Luxemburg, Malta, Romania, Slovakia, Slovenia, Vietnam, HK, Australia, NZ, Malaysia, Singapore, Indonesia, Philippines, and Thailand.
Environmental	Keyboard contains 25% post-consumer recycled plastic material	

HP PS/2 Optical Mouse

Dimensions (H x L x W)	1.56 x 2.44 x 4.61 in (3.95 x 6.21 x 11.7 cm)	
Weight	4.44 oz (126 g)	
Environmental	Operating temperature	-32° to 104°F (0° to 40° C)
	Non-operating temperature	-4° to 140°F (-20° to 60° C)
	Operating humidity	10% to 90% (non condensing at ambient)
	Non-operating humidity	10% to 90% (non condensing at ambient)
	Operating shock	40 g, 6 surfaces
	Non-operating shock	80 g, 6 surfaces
	Operating vibration	2 g peak acceleration
	Non-operating vibration	4 g peak acceleration
	Drop (out of box)	80 cm height onto asphalt tile over concrete or equivalent, 5-drop in 5 direction except the cable face
Electrical	Operating voltage	5 VDC ± 10%
	Power consumption	100mA
	System consumption	PS/2 mini-din connector
	ESD	CE level 4, 15 kV air discharge
	EMI-RFI	Conforms to FCC rules for a Class B computing device
	Microsoft PC99 - 2001	Functionally compliant
	Resolution	400 ± 20% DPI
	Tracking speed	10 in/s (25.4 cm/s) maximum
	Acceleration	100 in/s/s (2.54 m/s/s)

Technical Specifications - Input/Output Devices

Mechanical	Switch actuation	61 g nominal peak force
	Switch life	3,000,000 operations (using Hasco modified tester)
	Switch type	Low force micro-switches
	Tracking mechanism life	155 mi (250 km) at average speed of 10 in/s
	Cable length	6 ft (1.8 m)
	Microsoft PC99 - 2001	Mechanically compliant
Scroll wheel	Width	8 mm
	Diameter	1.01 in (25.6 mm)
	Maximum rotation speed	48 rats/sec
	Switch type	Light force micro-switch
	Switch life	1 million operations
	Mechanical life	Minimum 200,000 revolutions
Regulatory Approvals	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC	

HP USB Optical Mouse

Dimensions (H x L x W)	1.5 x 4.5 x 2.5 in (3.8 x 11.6 x 6.3 cm)
Weight	0.27 lb (0.12 kg)
Cable length	72.8 in (185 cm)
System requirements	Available USB port

HP USB Laser Mouse

Scroll Wheel	24	
Maximum Rotation Speed	48 rats/sec	
Switch Type	Wheel	
Switch Life	Button - 3,000,000	
	Wheel - 1,000,000 times	
	Tilt switch - 500,000 times	
Environmental	Operating Temperature	32° to 104° F (0° to 40° C)
	Non-operating Temperature	-4° to 140° F (-20° to 60° C)

Technical Specifications - Input/Output Devices

	Operating Humidity	10% to 90% (non-condensing at ambient)
	Non-operating Humidity	20% to 80% (non-condensing at ambient)
	Operating Shock	40 g, six surfaces
	Non-operating Shock	80 g, six surfaces
	Operating Vibration	2-g peak acceleration
	Non-operating Vibration	4-g peak acceleration
Electrical	Operating Voltage	+ 5VDC ± 5%
	Power Consumption	
	MTBF	> 150,000 hrs
	ESD	IEC-61000-4-2 criteria B, Contact discharge: +/- 4kV, Air discharge: +/- 8kV
	EMI-RFI	FCC Class B
	PC98	PC 99 Compliant
Mechanical	Resolution	800dpi
	Tracking Speed	25 cm/sec
	Acceleration	0.5mm
	Switch Actuation	0.6N (60gf)
	Switch Life	Button - 3,000,000
		Wheel - 1,000,000 times
		Tilt switch - 500,000 times
	Cable Length	1850mm
	PC98-99	PC99 compliant
Regulatory Approvals	UL60950-1, UL 94, UL 746 (A-E), UL 796 TUV/GS: EN 60950-1, EN 60825-1 FCC Class B, UL 1950, cUL, TUV GS, CE, C-tick, VCCI, BSMI, RRL	

HP USB PS/2 Washable Mouse

Dimensions (H x L x W)	1.56 x 2.44 x 4.61 in (3.95 x 6.21 x 11.7 cm)	
Weight	4.44 oz (126 g)	
Environmental	Operating temperature	–32° to 104°F (0° to 40° C)
	Non-operating temperature	–4° to 140°F (–20° to 60° C)
	Operating humidity	10% to 90% (non-condensing at ambient)

Technical Specifications - Input/Output Devices

	Non-operating humidity	10% to 90% non-condensing
	Operating shock	40 g, 6 surfaces
	Non-operating shock	80 g, 6 surfaces
	Operating vibration	2 g peak acceleration
	Non-operating vibration	4 g peak acceleration
	Drop (out of box)	80 cm height onto asphalt tile over concrete or equivalent, 5-drop in 5 direction except the cable face
Electrical	Operating voltage	5 VDC ± 10%
	Power consumption	100mA
	System consumption	PS/2 mini-din connector or USB
	ESD	CE level 2 8 kV air discharge
	EMI-RFI	Conforms to FCC rules for a Class B computing device
	Microsoft® PC99 – 2001	Functionally compliant
Mechanical	Resolution	1000 ± 20% DPI
	Tracking speed	14 in/s (35.56 cm/s) maximum
	Acceleration	2 g
	Switch actuation	70 g nominal peak force
	Switch life	3,000,000 operations (using Hasco modified tester)
	Switch type	Low force micro-switches
	Cable length	8.8 ft total 70 cm+ 2m extension
	Microsoft PC99 – 2001	Mechanically compliant
Scroll wheel	Width	6 mm
	Diameter	1 in (25.4 mm)
	Maximum rotation speed	48 rats/sec
	Switch type	Light force micro-switch
	Switch life	3 million operations
	Mechanical life	Minimum 200,000 revolutions
Regulatory approvals	Compliant	FCC, CE Mark, ICES-003-B, IP66/NEMA4X
Compatibility	Operating system support	Windows 7, Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32* (No driver is required for this device. Native support is provided by the operating system.), xpe, ce.net, Linux, XP-64 * Certain Windows Vista product features require advanced or additional hardware. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit: http://www.windowsvista.com/upgradeadvisor. For Windows Vista system requirements, visit: http://www.windowsvista.com/systemrequirements.

Unit Environment and Operating Conditions

General Unit Operating Guidelines

- Keep the computer away from excessive moisture, direct moisture and the extremes of heat and cold, to ensure that unit is operated within the specified operating range.
- Leave a 10.2 cm (4 in) clearance on all vented sides of the computer to permit the required airflow.
- Never restrict airflow into the computer by blocking any vents or air intakes.
- Do not stack computers on top of each other or place computers so near each other that they are subject to each other's re-circulated or preheated air.
- Occasionally clean the air vents on the front, back, and any other vented side of the computer. Lint, dust and other foreign matter can block the vents and limit the airflow.
- If the computer is to be operated within a separate enclosure, intake and exhaust ventilation must be provided on the enclosure, and the same operating guidelines listed above will still apply.

Temperature Range	Operating: 50° to 95° F (10° to 35° C)* Non-operating: –22° to 140° F(–30° to 60° C)
Relative Humidity	Operating: 10% to 90% (non-condensing at ambient) Non-operating: 5% to 95% (non-condensing at ambient)
Maximum Altitude (unpressurized)	Operating: 10,000 ft (3048 m) Non-operating: 30,000 ft (9144 m)

*Operating temperature is de-rated 1.0 deg C per 300 m (1000 ft) to 3000 m (10,000 ft) above sea level, no direct sustained sunlight. Maximum rate of change is 10 deg C/Hr. The upper limit may be limited by the type and number of options installed.

Power Supply	SFF	MT
Standard Efficiency	240W active PFC	320W active PFC
High Efficiency*	240W active PFC 87/90/87% efficient @ 20/50/100% load	320W active PFC 87/90/87% efficient @ 20/50/100% load
Operating Voltage Range	90 - 264 VAC	
Rated Voltage Range	100 - 240 VAC	
Rated Line Frequency	50/60 Hz	
Operating Line Frequency Range	47 – 63 Hz	
Rated Input Current	4A	5.5A
Rated Input Current with Energy Efficient* Power Supply	4A	5.5A
Current Leakage (NFPA 99)	< 275 µA	< 450 µA
Power Supply Fan	92mm variable speed	
Power cord length	6.0 ft. (1.83 m)	
Total Cord Length	N/A	N/A

*High efficiency power supply is a requirement for ENERGY STAR qualification in conjunction with a select range of processors and modules

Technical Specifications – Weights & Dimensions

Weights & Dimensions (configured with 1 HDD & 1 ODD)	SFF	MT
Chassis (H x W x D)	4.0 x 13.3 x 14.9 in 100 x 338 x 379 mm	14.9 x 7.0 x 17.0 in 377 x 177 x 431 mm
System Volume	790.3 cu in 13.0 L	782.77 cu in 12.8 L
System Weight*	16.7 lb 7.6 kg	20.5 lb 9.3 kg
Max Supported Weight (desktop orientation)	77.0 lb 35.0 kg	N/A
Tower Stand (H x W x D)	1.1 x 7.0 x 7.9 in (29 x 178 x 200 mm)	N/A
Packaging (H x W x D)	9.0 x 19.8 x 23.4 in 229 x 500 x 594 mm	11.6 x 19.7 x 23.2 in 295 x 500 x 590 mm
Shipping Weight*	17.9 lb 8.1 kg	28.8 lb 13.1 kg
Palletization Profile	4-units per layer 10-layer max. 40-units per pallet	4-units per layer 8-layer max. 32-units per pallet

Environmental Specifications

Eco-Label Certifications & declarations

This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks:

- US ENERGY STAR®
- IT ECO declaration
- EPEAT® Gold where HP registers commercial desktop products. See http://www.epeat.net for registration status in your country

System Configuration

The configuration used for the Energy Consumption and Declared Noise Emissions data for the Small Form Factor Desktop model is based on a typically configured product.

Energy Consumption	**115 VAC**		**230 VAC**		**100 VAC**	
	MT	**SFF**	**MT**	**SFF**	**MT**	**SFF**
Normal Operation	51.7 W	48.3 W	52 W	47.7 W	51.4 W	47.6 W
Sleep (Energy Star low power mode)	2.9 W	3.0 W	3.1 W	3.3 W	2.9 W	3.0 W
Off	0.9 W	1.0 W	1.1 W	1.1 W	0.9 W	0.9 W

NOTE:
Energy efficiency data listed is for an ENERGY STAR® compliant product if offered within the model family . HP computers marked with the ENERGY STAR® Logo are compliant with the applicable U.S. Environmental Protection Agency (EPA) ENERGY STAR® specifications for computers. If a model family does not offer ENERGY STAR® compliant configurations, then energy efficiency data listed is for a typically configured model.

Heat Dissipation*	**115 VAC**		**230 VAC**		**100 VAC**	
	MT	**SFF**	**MT**	**SFF**	**MT**	**SFF**
Normal Operation	177 BTU/hr	165 BTU/hr	178 BTU/hr	163 BTU/hr	176 BTU/hr	163 BTU/hr
Sleep	10 BTU/hr	10 BTU/hr	11 BTU/hr	11 BTU/hr	10 BTU/hr	10 BTU/hr
Off	3 BTU/hr	3 BTU/hr	4 BTU/hr	4 BTU/hr	3 BTU/hr	3 BTU/hr

* Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296) (Typically Configured)	**Sound Power (LWAd, bels)**		**Sound Pressure (LpAm, decibels)**	
Idle	3.8	3.8	28	28
Fixed Disk (random writes)	3.9	3.8	29	28

Longevity and Upgrading

This product can be upgraded, possibly extending its useful life by several years. Upgradeable features and/or components contained in the product may include:

Environmental Specifications

MT:

- Intel LGA775 processor socket
- 8 USB ports
- 1 empty PCI slot (w/ optional PCI riser card) , or
  1 empty PCIe x16 slot (w/optional PCIe riser card)
- 1 internal drive slot
- 1 Slimline optical drive slot
- 3 memory slots
- 1 Serial/Parallel Port (optional)

SFF:

- Intel LGA775 processor socket
- 8 USB ports
- 2 empty PCI slots (2 low profile or 2 full-height with optional riser)
- 1 empty PCIe x1 slot
- 1 empty PCIe x16 slot
- 1 internal drive slot
- 1 SATA optical drive slot
- 4 memory slots
- 1 Serial Port (optional)
- 1 external diskette drive (optional)
- Spare parts are available throughout the warranty period and or for up to "5" years after the end of production

Batteries	This battery(s) in this product comply with EU Directive 2006/66/EC Batteries used in the product do not contain: • Mercury greater the 5ppm by weight • Cadmium greater than 10ppm by weight
Battery Size	CR2032 (coin cell)
Battery Type	Lithium
Additional Information	This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive – 2002/95/EC. This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive – 2002/96/EC. This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986). This product is in compliance with the IEEE 1680 (EPEAT) standard at the Gold level where HP registers commercial desktop products. See http://www.epeat.net for registration status in your country.Plastics parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043. This product contains 5.6% post-consumer recycled plastic (by wt.) This product is 94.82% recyclable when properly disposed of at end of life.
Packaging Materials	External Paper Corrugated – 2278 g

PLASTIC/EPS (Expanded Polystyrene) – 114 g
PLASTIC/Polyethylene low density – 56 g
PLASTIC/Polypropylene – 15 g

The PAPER/Corrugated packaging material contains at least 30.6% recycled content.
The PLASTIC/EPS (Expanded Polystyrene) packaging material contains at least 0% recycled content.
The PLASTIC/Polyethylene low density packaging material contains at least 0% recycled content.
The PLASTIC/EPS (Expanded Polystyrene) packaging material contains at least 0% recycled content.

RoHS Compliance

Hewlett-Packard is committed to compliance with all applicable environmental laws and regulations, including the European Union Restriction of Hazardous Substances (RoHS) Directive. HP's goal is to exceed compliance obligations by meeting the requirements of the RoHS Directive on a worldwide basis. By July 1, 2006, RoHS substances will be virtually eliminated (virtually = to levels below legal limits) for all HP electronic products subject to the RoHS Directive, except where it is widely recognized that there is no technically feasible alternative (as indicated by an exemption under the EU RoHS Directive).

Material Usage

This product does not contain any of the following substances in excess of regulatory limits (refer to the HP General Specification for the Environment at: http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html):

- Asbestos
- Certain Azo Colorants
- Certain Brominated Flame Retardants – may not be used as flame retardants in plastics
- Cadmium
- Chlorinated Hydrocarbons
- Chlorinated Paraffins
- Formaldehyde
- Halogenated Diphenyl Methanes
- Lead carbonates and sulfates
- Lead and Lead compounds
- Mercuric Oxide Batteries
- Ozone Depleting Substances
- Polybrominated Biphenyls (PBBs)
- Polybrominated Biphenyl Ethers (PBBEs)
- Polybrominated Biphenyl Oxides (PBBOs)
- Polychlorinated Biphenyl (PCB)
- Polychlorinated Terphenyls (PCT)
- Polyvinyl Chloride (PVC) – except for wires and cables, and certain retail packaging has been voluntarily removed from most applications.
- Radioactive Substances
- Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO)
- Nickel finishes that release greater than 0.5 micro-grams/cm^2/week, measured according to EN 1811:1998, are not used on any product surface designed to be frequently handled or touched by users.

Packaging

HP follows these guidelines to decrease the environmental impact of product packaging:

- Eliminate the use of heavy metals such as lead, chromium, mercury and cadmium in packaging materials.
- Eliminate the use of ozone-depleting substances (ODS) in packaging materials.

Environmental Specifications

- Design packaging materials for ease of disassembly.
- Maximize the use of post-consumer recycled content materials in packaging materials.
- Use readily recyclable packaging materials such as paper and corrugated materials.
- Reduce size and weight of packages to improve transportation fuel efficiency.
- Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.

End-of-life Management and Recycling

Hewlett-Packard offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: http://www.hp.com/go/reuse-recycle or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.

The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: http://www.hp.com/go/recyclers. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

Hewlett-Packard Corporate Environmental Information

For more information about HP's commitment to the environment:
Global Citizenship Report
http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html
Eco-label certifications
http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html
ISO 14001 certificates:
http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html

Technical Specifications – Miscellaneous Features

Management Features

- Advanced Configuration and Power Management Interface (ACPI). Allows the system to wake from a low power mode. Controls system power consumption, making it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system.
- Dual State Power Button; acts as both an on/off button and a suspend-to-sleep button

Serviceability Features

- Dual colored power LED on front of computer to indicate either normal or fault condition
- Diagnostic LED Explanation Table:
  - Number of 1-second red LED blinks followed by a 2-second pause, then repeats:
    - 2 - processor thermal protection activated
    - 3 - processor not installed
    - 4 - power supply failure
    - 5 -- memory error
    - 6 - video error
    - 7 - PCA failure (ROM detected failure prior to video)
    - 8 - invalid ROM, bootblock recovery mode
    - 9 - system not fetching code
    - 10 - system hang while loading an option ROM
- System/Emergency ROM
- Flash ROM
- CMOS Battery Holder for easy replacement
- Flash Recovery with Video Configuration Record Software
- 5 Aux Power LED on System PCA
- Processor ZIF Socket for easy Upgrade
- Over-Temp Warning on Screen (Requires IM Agents)
- Clear Password Jumper
- DIMM Connectors for easy Upgrade
- Clear CMOS Button
- NIC LEDs (integrated) (Green & Amber)
- Dual Color Power and HD LED - To Indicate Normal Operations and Fault Conditions
- Color coordinated cables and connectors
- Tool-less Hood Removal
- Front power switch
- System memory can be upgraded without removing the system board or any internal components
- Tool-less Hard Drive, CD & Diskette Removal
- Green Pull Tabs, and Quick Release Latches for easy Identification

Technical Specifications – Miscellaneous Features

Additional Features	Description
Towerable Orientation	Product can be oriented as either a desktop or a tower
Drive Lock	Implementation of the industry standard ATA Security feature set. When enabled, it prevents software access to user data on the drive until one or two user-defined passwords are provided.
Drive Protection System	DPS Access through F10 Setup during Boot A diagnostic hard drive self test. It scans critical physical components and every sector of the hard drive for physical faults and then reports any faults to the user Running independently of the operating system, it can be accessed through a Windows-based diagnostics utility or through the computer's setup procedure. It produces an evaluation on whether the hard drive is the source of the problem and needs to be replaced
SMART Technology (Self-Monitoring, Analysis and Reporting Technology)	The system expands on the Self-Monitoring, Analysis, and Reporting Technology (SMART), a continuously running systems diagnostic that alerts the user to certain types of failures Allows hard drives to monitor their own health and to raise flags if imminent failures were predicted
SMART I - Drive Failure Prediction	Predicts failures before they occur. Tracks fault prediction and failure indication parameters such as re-allocated sector count, spin retry count, calibration retry count
SMART II - Off-Line Data Collection	By avoiding actual hard drive failures, SMART hard drives act as "insurance" against unplanned user downtime and potential data loss from hard drive failure
SMART III - Off-Line Read Scanning with Defect Reallocation	IOEDC: I/O Error Detection Circuitry Detects errors in Read/Write buffers on HDD cache RAM
SMART IV - End-to-End CRC for hard drives	Interface in F10 setup provides confirmation of SMART IV support.

After-Market Options (availability may vary by region)

Communication Devices

	Part Number
HP Wireless 802.11 b/g/n NIC (PCIe x1)	FH971AA
Intel ethernet i210-T1 GbE NIC	E0X95AA

Graphics Solutions

	Part Number
AMD Radeon HD 6350 Graphics (PCIe x16)	QK638AA
AMD Radeon HD 7450 Graphics Card	B1R44AA
Nvidia NVS 300 Graphics (PCIe x16)	BV456AA
Nvidia NVS 310 Graphics (PCIe x16)	A7U59AA
HP DisplayPort Cable Kit	VN567AA
HP DisplayPort To Dual Link DVI-D Adapter	NR078AA
HP DisplayPort To DVI-D Adapter	FH973AA
HP DisplayPort to HDMI Adapter	BP937AA
HP DisplayPort to VGA Adapter	AS615AA
HP DMS-59 to Dual DVI Cable	DL139A
HP DMS-59 to Dual DisplayPort Adapter	XP688AA

Data Storage Drives and Accessories

	Part Number
HP 300GB 10K rpm SATA 3.0Gb/s 2.5" Hard Disk Drive (Includes 3.5"adapter)	FM802AA
HP 500GB 7.2K rpm SATA 6.0Gb/s 3.5" Hard Disk Drive	QK554AA
HP 1TB 7.2K rpm SATA 6.0Gb/s 3.5" Hard Disk Drive	QK555AA
HP 500GB SATA 6G (8GB Cache) SSHD Drive (includes 3.5" adapter)	E1C62AA
HP eSATA Adapter	FH966AA
HP Removable SATA Hard Drive Enclosure (frame & carrier)	RY102AA
HP Removable SATA Hard Drive Enclosure (carrier only)	RY103AA

After-Market Options (availability may vary by region)

Input Devices

	Part Number
HP PS/2 Standard Keyboard	DT527A
HP USB Standard Keyboard	DT528A
HP USB Gray Keyboard	DT529A
HP USB Smart Card (CCID) Keyboard	BV813AA
HP USB Washable Keyboard	VF097AA
HP USB and PS/2 Washable Mouse	BM866AA
HP USB and PS/2 Washable Keyboard and Mouse Kit	BU207AA
HP PS/2 Optical Mouse	EY703AA
HP USB Optical Mouse	DC172AT
HP USB Laser Mouse	GW405AT
HP Wireless Keyboard and Mouse Combination (Keyboard contains 25% post-consumer recycled plastic material)	NB896AA

System Memory

	Part Number
HP 2 GB DDR3 - 1600 DIMM	B4U35AA
HP 4 GB DDR3 - 1600 DIMM	B4U36AA
HP 8 GB DDR3 - 1600 DIMM	B4U37AA

Multimedia Devices

	Part Number
HP Thin USB Powered Speakers	KK912AA
HP DVD-ROM Drive	AR629AA
HP SATA 16x SuperMulti Drive	QS208AA
HP Blu-ray BDXL SATA Drive	B4F70AA
HP USB HD 720P Business Webcam	QP896AA
HP Business Headset	QK550AA
HP USB Business Speakers	D9J19AA

Removable Media Storage

	Part Number
HP 22-n-1 Media Card Reader	AR941AA

Security Devices

	Part Number
HP Business PC Security Lock	PV606AA
HP SFF Solenoid Lock and Hood Sensor	BP428AA
HP MT Solenoid Lock and Hood Sensor	DE618A
HP SFF Wall Mount/Security Sleeve	VN570AA
HP Keyed Lock Cable	BV411AA

After-Market Options (availability may vary by region)

Stands and Accessories

	Part Number
HP Integrated Work Center Stand (SFF)	QP897AA
HP SFF Tower Stand	VN569AA
HP Serial Port Adapter (RS-232 compatible)	PA716A
HP Parallel Port Adapter	KD061AA
HP 5.25” Blank Bezel Kit (50 pack)	DC177B

LANDesk Software (E-Delivery)

	Part Number
LANDesk Management Suite License - 1-499 Nodes E-Delivery	QY369AAE
LANDesk Management Suite License - 500-999 Nodes E-Delivery	QY370AAE
LANDesk Management Suite License - 1000-1999 Nodes E-Delivery	QY371AAE
LANDesk Management Suite License - 2000-4999 Nodes E-Delivery	QY372AAE
LANDesk Management Suite License - 5000-9999 Nodes E-Delivery	QY373AAE
LANDesk Security Suite License E-Delivery	QY379AAE
LANDesk Management Suite 1 Year Maintenance - 1-499 Nodes E-Delivery	HZ825AAE
LANDesk Management Suite 1 Year Maintenance - 500-999 Nodes E-Delivery	HZ826AAE
LANDesk Management Suite 1 Year Maintenance - 1000-1999 Nodes E-Delivery	HZ827AAE
LANDesk Management Suite 1 Year Maintenance - 2000-4999 Nodes E-Delivery	HZ828AAE
LANDesk Management Suite 1 Year Maintenance - 5000-9999 Nodes E-Delivery	HZ829AAE
LANDesk Security Suite 1 Year Subscription	HZ830AAE
LANDesk Patch Management 1 Year Subscription - 1-499 Nodes E-Delivery	HZ831AAE
LANDesk Patch Management 1 Year Subscription - 500-999 Nodes E-Delivery	HZ832AAE
LANDesk Patch Management 1 Year Subscription - 1000-1999 Nodes E-Delivery	HZ833AAE
LANDesk Patch Management 1 Year Subscription - 2000-4999 Nodes E-Delivery	HZ834AAE
LANDeskPatch Management 1 Year Subscription - 5000-9999 Nodes E-Delivery	HZ835AAE

Monitors

	Part Number
HP Compaq LE1711 17-inch LCD Monitor	EM886AA
HP Compaq LE1911 19-inch LCD Monitor	EM887AA
HP Compaq LE2002x 20-inch LED Backlit LCD Monitor	LL763AA
HP Compaq LE2002xi 20-inch LCD Monitor with IWC Stand	QC841AA
HP Compaq LE2002xm 20-inch LED Backlit LCD Monitor	A2U63AA
HP Compaq LE2202x 21.5-inch LED Backlit LCD Monitor	LL649AA
HP Compaq L2206tm 21.5-inch LED Backlit Touch Monitor	B0L55AA
HP L2401x 24-inch LED Backlit Monitor	B6R21AA

After-Market Options (availability may vary by region)

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